HAMILTON'S ARITHMETICS

FIRST BOOK

NEW JERSEY
EDITION

WITH ANSWERS

HAMILTON'S ARITHMETICS

FIRST BOOK

BY

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PREFACE

THIS First Book in Arithmetic is intended to cover the work of the first four years. It is based on, and closely follows, the Course of Study issued by the Department of Public Instruction of the State of New Jersey.

The aim of the course is twofold: first, to give the child mathematical skill; second, to give him mathematical power.

It is divided into work for four grades.

The purpose of the *first grade* work is to suggest to the teacher those phases of number work which may be taught incidentally in connection with other subjects, and to show by concrete examples how this may be done.

The *second grade* is devoted mainly to the forty-five so-called primary number facts of addition and subtraction. The textbook may be placed in the hands of the pupil when he enters upon the work of this grade.

The purpose of the *third grade* work is to complete the fundamental operations.

The *fourth grade* work contains little that may be called new; but it leads the pupils farther along lines they have already traveled.

In the New Jersey course of study the unit of classification is the half year. With this in view, the subject matter in the second, third, and fourth years has been separated into two parts.

FOURTH GRADE

FIRST GRADE

SUGGESTIONS TO TEACHERS

I. Exercises that involve the recognition of number.

1. *Sorting and arranging objects* according to definite directions.

a. Stringing wooden beads; for example, one red bead and two white beads or two red beads and three white beads, etc.

b. Making borders of parquetry papers; for example, two circles and one square repeated a given number of times.

c. Laying sticks by twos, threes, etc., to form borders.

d. Placing colored pegs in a peg board according to a given plan.

2. *Weaving mats* — over one, under two, over three, etc.

3. *Distributing material* by permitting pupils to select from a box three splints or four cubes, or one mat and five strips, etc.

4. *Games:*

a. Play "Soldier Boy" until six pupils have been chosen or until eight flags have been distributed.

Soldier Boy.[1] The children form in a ring. One child in the center carries several flags over his shoulder and marches around while all the children sing "Soldier Boy, Soldier Boy." At the words, "If you'll be a soldier boy," the child who is marching halts in front of the straightest soldier in the circle, salutes, and presents him with a flag. The child who receives the flag follows the leader and marches in the circle. This is repeated until a number of children have been chosen.

b. In "The Lame Fox" tell the number of chickens that were caught.

Lame Fox and Chickens.[2] One player, who is chosen for the fox, stands in a den marked off at one end of the room. The rest are chickens and have a chicken yard at the other end of the room. The chickens advance to the den of the fox and tease him by calling out, "Lame Fox! Lame Fox! Can't catch anybody!" The lame fox may take only three steps beyond his den, after which he must hop on one foot trying to catch the chickens while hopping. The chickens caught are taken to the den and become foxes. They then hop on one foot and help to catch the other chickens. The last chicken caught becomes the lame fox for the next game.

5. *Dramatization.* Decide as to the number and select the number of pupils needed to dramatize:

a. The Little Red Hen.[3]

b. Chicken Little.[3]

c. The Old Woman and her Pig.[3]

[1] See *Children's Singing Games* by M. R. Hofer (A. Flanagan Company).

[2] See *Games for the Playground, Home, School, and Gymnasium* by Jessie H. Bancroft (The Macmillan Company).

[3] See *For the Children's Hour* by Bailey and Lewis (Milton Bradley Co.)

6. *Nature Study.*

a. Identifying trees in the neighborhood whose leaves have one part or more than one part. For example, in the peach tree, the horse-chestnut tree, the maple tree, note the number of parts to the leaf or the number of lobes caused by the indentations.

b. Study of fruit, noting the number of seed cases in the apple, the peach, and the bean.

c. Studies in germination, noting the number of peas or beans planted, the number of shoots that come up in each case, and the number of leaves that appear.

d. Study of twigs, noting the number of buds on the twig, whether arranged by ones or by twos, the number of buds that have opened, the number of leaves folded within the buds.

e. Recognition of flowers by noting color and parts. For example, the buttercup has only one color. The pansy usually has three colors. Each has five parts.

f. Gardening. Note the number of beds of lettuce plants set out, the number of plants in each bed, the number of rows of radishes sown, the number of bunches gathered, the number of pupils who cared for each bed.

II. Exercises that involve the use of ordinals.

1. For convenience in giving directions in the classroom, *files* may be named first file, second file, etc.

2. *Pages* in the reader may sometimes be designated as first page, fifth page, etc.

3. Reference in nature study to the *order of events; e.g.* the bud that opened first or the bean that was the first to sprout.

4. Reference to the *days of the week* as the first day, the second day, etc.

5. Reference to the *days of the month* as the fifth day, the seventh day, etc.

III. Exercises that involve counting.

1. Counting by ones, twos, fives, or tens the number of *beads* strung, the number of sticks or cubes or circles in a certain border made.

2. Counting by ones and by twos the number of *pupils marching.*

3. Counting the number of *trees* of a certain kind in the neighborhood.

4. Counting the number of *houses* in a particular block.

5. Counting the *pupils in the class* or in some particular file.

6. Counting *material,* books, pencils, etc., distributed and collected.

7. Counting and tying in bunches *garden products;* for example, radishes and carrots grown in the school garden. Counting the bunches.

IV. Exercises that involve the use of one half, one third, and one fourth.

Cutting and folding of paper or cardboard.

a. Making calendars, picture frames, boxes, and baskets for Christmas or Easter.

b. Classroom decoration for special occasions.

c. Making furniture for dolls' houses.

d. Covering kite frames.

e. Constructing tents, canoes, and sleds for Indian and Eskimo villages.

V. Exercises that involve the reading of numbers to 100.

1. Finding *pages* in the class reader.

2. In cities, reading the *numbers of houses.*

3. In country places, reading the *numbers on the post-office boxes.*

4. In large schools, reading the *numbers on the doors of classrooms.*

5. Reading the *numbers of pupils' lockers* and hooks in the cloakroom.

6. Reading the *dates* on the calendar.

VI. Exercises that involve the writing of figures.

1. *Records* kept by teacher and pupils showing:

a. The number of different wild flowers found in a certain week.

b. The number of showers in a certain spring month.

c. The various dates on which beans, corn, peas, etc., were planted, and the dates on which the roots, leaves, blossoms, etc., first appeared.

d. The date of the first snowfall or the appearance of the first robin or butterfly.

e. The date of the first migration of birds noted in the fall.

2. *Class records* kept by pupils on the blackboard.

a. The number of pupils belonging to the class each day.

b. The number of pupils present.

c. The number of pupils not tardy.

d. The number of days each pupil attends school during the month.

e. Record of classroom temperature at certain times of the day.

f. The number of the file or files that did good work in some particular lesson.

g. Scores kept of games played by pupils.

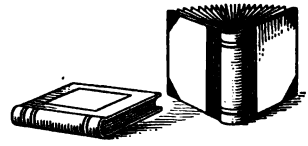
SECOND GRADE — FIRST HALF

READING AND WRITING NUMBERS

1	2	3	4	5

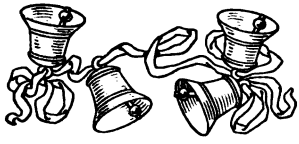
one* 1

two 2

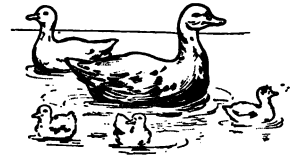


three 3

four 4



five 5



* The teacher should encourage the pupils to copy this script in the size they are using for their other work.

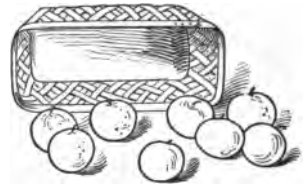
READING AND WRITING NUMBERS

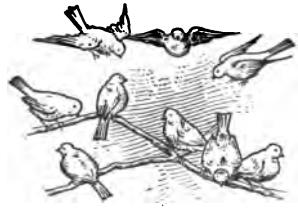
6	7	8	9	10

six
6

seven
7

eight
8





nine
9

ten
10

READING AND WRITING NUMBERS

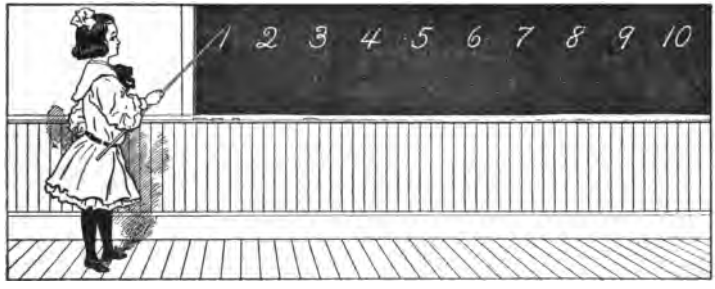
One to Ten

1. Read:

one pail	1 pail
two books	2 books
three caps	3 caps
four bells	4 bells
five ducks	5 ducks
six tops	6 tops
seven eggs	7 eggs
eight apples	8 apples
nine birds	9 birds
ten balls	10 balls

Numbers are used to tell how many. You can write numbers either in words or in figures.

naught	one	two	three	four	five	six	seven	eight	nine	ten
0	1	2	3	4	5	6	7	8	9	10

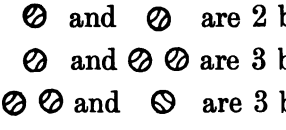


2. Read the numbers on this blackboard.

3. Write in figures: one, two, three, four, five, six, seven, eight, nine, and ten.

THE NUMBERS TWO AND THREE

$1+1=2$
$2+1=3$
$1+2=3$



and are 2 balls.

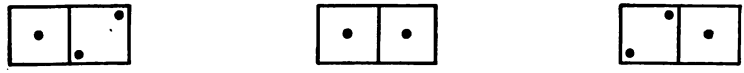
and are 3 balls.

and are 3 balls.

1. Touch 2 boys and 1 boy. How many boys did you touch?

2. Take 1 pin and 1 pin. How many pins did you take?

3. Draw 1 kite and 2 kites. How many kites did you draw?



4. How many are 1 and 2? 1 and 1? 2 and 1?

The sign + is read **and** or **plus**.

The sign = is read **equal** or **equals**.

$2+1=3$ is read 2 plus 1 equals 3.

5. Read: $1+1=2$ $2+1=3$ $1+2=3$

6. Mother gave 2 apples to Mary and 1 apple to John. How many apples did she give to both?

7. There was one bird in a nest and two birds were sitting on a branch. How many birds were there?

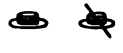
8. Make problems about one horse and two horses.

THE NUMBERS TWO AND THREE

$2-1=1$
$3-1=2$
$3-2=1$

1. Take one ball from three balls. How many balls are left?

2. Take two tops from three tops. How many tops are left?



3. One hat taken from two hats leaves how many hats?

Three balls less one ball are two balls.
3 tops less 2 tops are 1 top.
The sign $-$ is read **minus** or **less**.
$3-2=1$ is read 3 minus 2 equals 1.

4. Read: $3-1=2$ $2-1=1$ $3-2=1$

5. John had three balls and lost one of them. How many balls had he left?

6. How many are 3 cents less 2 cents?

7. 2 books less 1 book are how many books?

8. Make problems about two birds less one bird.

9. Make problems about three cats less two cats.

10. Fill in the blank spaces:

$3-?=2$	$1+?=3$	$2-1=?$
$?-2=1$	$1+1=?$	$?+1=3$

THE NUMBER FOUR

3 + 1 = 4	4 − 3 = 1
2 + 2 = 4	4 − 2 = 2

1. Take 4 flags. Give 1 to your teacher. How many flags have you left?

2. Frank had 4 flags. He gave 2 flags to John. How many flags had he left?

3. Two girls were playing a game. Two more girls came to play with them. How many girls were then playing?

4. From a bag containing 4 eggs, 3 eggs were taken. How many eggs were left?

5. Lucy is 3 years old. Kate is 1 year older. How old is Kate?

6. Hector had 4 pigeons. He gave 1 to his cousin. How many pigeons had he then?

7. Make problems about 2 cents and 2 cents.

8. Make problems about 3 marbles and 1 marble.

9. Fill the blank spaces:

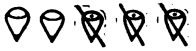
3 + 1 = ? 4 − ? = 3 ? + 2 = 4 4 − 2 = ?

THE NUMBER FIVE

$4+1=5$	$5-1=4$
$3+2=5$	$5-3=2$

 and  are 5 tops.

 and  are 5 tops.

 5 tops less 3 tops are 2 tops.

 5 tops less 1 top are 4 tops.

1. James spent 2 cents for a cake and 3 cents for an orange. How many cents did he spend?

2. Mary picked 5 flowers. She gave 3 to her cousin. How many flowers had she left?

3. How much have I left from a nickel when I have bought a two-cent stamp?

4. James had 4 cents and earned 1 cent more. How many cents did he then have?

5. Make problems about 2 sleds and 3 sleds.

6. Make problems about 1 boy and 4 boys.

7. Copy and read the following:

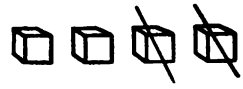
$4+1=5$	$5-1=4$	$2+3=5$	$5-3=2$
$1+4=5$	$5-4=1$	$3+2=5$	$5-2=3$

8. Three and how many are five? $3+?=5$

9. Five is how many more than two? $5-?=2$

NUMBERS ONE TO FIVE

3 + 2 = 5



4 − 2 = 2

1. Give at sight. Make problems:

3 + 2 = ?	5 − 3 = ?	5 − 2 = ?	3 − 2 = ?	1 + 4 = ?
2 + 1 = ?	1 + 2 = ?	4 + 1 = ?	2 + 2 = ?	2 + 3 = ?
4 + 0 = ?	3 + 1 = ?	1 + 3 = ?	4 − 3 = ?	4 − 2 = ?

Numbers to be added are also written like this: $\begin{array}{r} 2 \\ \underline{3} \\ 5 \end{array}$

We call 5 the **sum** of 2 and 3.

2. Give sums:

2	1	3	2	4	1	1	4	2	3
3	4	1	2	1	3	2	0	1	2

3. Fill the blank spaces:

( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
2	1	0	2	3	1	2	1	4	3
5	3	4	3	4	5	4	4	5	5

4. Take the lower number from the one above it:

5	2	3	4	1	5	5	4	3	5
3	1	2	2	1	2	4	3	1	0

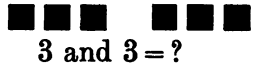
5. Five is how many more than two?

6. Four is two more than what number?

THE NUMBER SIX

$5+1=6$	$6-5=1$
$2+4=6$	$6-3=3$
$3+3=6$	$6-4=2$

4 and 2 are how many?



3 and 3 = ?

5 and 1 are how many?

1. Show with marbles all the groups of two numbers whose sum is 6.

2. Take 4 tops from 6 tops. How many are left?

3. Add:

2	3	1	4	3	5	4	0
4	2	5	1	3	1	2	6

4. Supply the missing numbers:

$?+3=6$	$6-1=?$	$3+3=?$	$6-5=?$
$4+?=6$	$?-0=6$	$2+4=?$	$6-?=3$

To **subtract** is to take one number from another.

5. Subtract:

6	5	6	6	6	6	6	6
6	2	3	1	5	2	4	0

6. Louise had a nickel and 1 cent. How much money had she?

7. She spent 3 cents for a pad. How much had she left?

HALVES OF NUMBERS

One half $\frac{1}{2}$

1. James had six ducks. He gave a certain number to his brother Tom and kept the same number for himself. How many ducks did each boy then have?

2. What part of all his ducks did James give to Tom?

3. Place six cubes in two equal groups. What part of the six cubes is in the first group? in the second group?

4. What part of six do we call each group?

5. How many cubes are there in one half of six cubes?

We write "one half of six is three" in this way:

$\frac{1}{2}$ of $6 = 3$.

6. One half of 2 oranges is how many oranges?

7. Find $\frac{1}{2}$ of 4 cents; $\frac{1}{2}$ of 6 cents.

8. I had 4 cents and bought a 2-cent stamp. What part of my money did I spend?

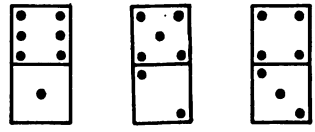
9. Make a drawing to show that one half of 6 eggs is 3 eggs.

10. Give at sight:

$\frac{1}{2}$ of $6 = ?$ $\frac{1}{2}$ of $2 = ?$ $\frac{1}{2}$ of $4 = ?$

THE NUMBER SEVEN

$6+1=7$	$7-2=5$
$5+2=7$	$7-4=3$
$4+3=7$	$7-6=1$



1. Show with blocks all the groups of two numbers whose sum is seven.

2. Add:

3	4	5	6	1	2	3	5
4	3	1	1	6	5	3	2

3. From 7 take 3; take 5; 2; 6; 1; 4; 7.

4. Add 3 to 1; to 4; to 2; to 3.

5. Add 2 to 2; to 1; to 5; to 4; to 3.

6. A nickel and 2 cents are worth how many cents?

7. Frank works every day except Sunday. How many days does he work each week?

8. Charles had 7 dollars. He paid 3 dollars for a pair of shoes. How much money had he left?

9. Subtract:

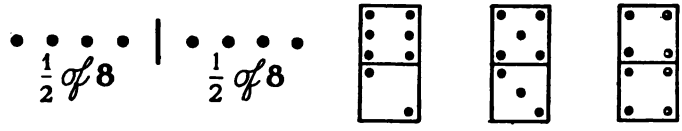
7	7	7	6	4	7	7
3	2	2	3	3	4	5

10. Take 2 from each number from 2 to 7.

11. Take 3 from each number from 3 to 7.

THE NUMBER EIGHT

7 + 1 = 8	8 − 7 = 1
6 + 2 = 8	8 − 6 = 2
5 + 3 = 8	8 − 5 = 3
4 + 4 = 8	8 − 4 = 4



1. Show with splints all the groups of two numbers whose sum is eight.

2. Add up, then down:

4	3	5	2	7	1	6	5	4	6	2
4	5	2	6	1	7	1	3	3	2	5

3. Subtract:

8	8	6	8	8	7	8	8	8	8	7
3	7	3	1	6	5	4	8	5	2	4

4. Give answers at sight:

4 + 4 = ?	8 − 6 = ?	8 − 4 = ?	8 + 0 = ?
8 − 5 = ?	½ of 8 = ?	3 + 5 = ?	8 − 7 = ?
5 + 3 = ?	6 + 2 = ?	8 − 2 = ?	7 + 1 = ?

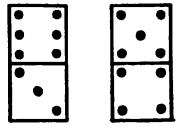
5. Louis had 8 apples and gave 3 to Anna. He had —— apples left.

6. Anna is 8 years old. Four years ago she was —— years old.

THE NUMBER NINE

8 + 1 = 9	9 − 1 = 8
6 + 3 = 9	9 − 6 = 3
7 + 2 = 9	9 − 7 = 2
4 + 5 = 9	9 − 4 = 5

1. Show with splints all the groups of two numbers whose sum is nine.



2. Add:

4	2	3	7	1	6	5	4	8	3
5	7	5	2	8	3	4	4	1	6

3. From 9 take 8; take 7; 6; 5; 3; 2; 4; 1; 9.

4. Fill the blank spaces:

( )	( )	( )	( )	( )	( )	( )	( )	( )
+ 3	2	4	6	5	5	7	4	8
9	9	9	9	9	8	9	8	9

5. Subtract:

9	9	9	9	9	9	9	9	9	9
8	9	1	5	6	2	3	7	4	0

6. Henry had 6 cents and earned 3 cents. He then had —— cents.

7. John paid 5 cents for a penholder and 4 cents for a pencil. How much did both cost?

8. John and James together have 9 cents. If John has 5 cents, how many cents has James?

THIRDS OF NUMBERS

One third $\frac{1}{3}$

1. Place 6 cents in 3 equal groups. We call each group one third of six cents.

2. What part of 6 cents is in the first group?

3. What part of 6 cents is in the third group?

4. How many cents are there in one third of 6 cents?

5. One third of six oranges is how many oranges?

We write "one third of six is two" in this way: $\frac{1}{3}$ of $6 = 2$.

6. Draw 9 balls and divide them into 3 equal groups.

7. What name is given to each group?

8. How many balls are there in $\frac{1}{3}$ of 9 balls?

9. If you separate three splints into three equal groups, how many will there be in each group?

10. Maud had 9 cherries. She gave one third of them to Edith. How many cherries did Edith receive?

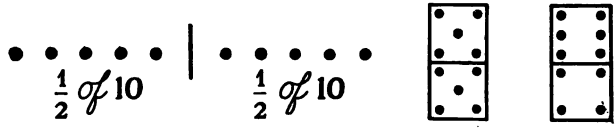
11. One third of 6 eggs were broken. How many eggs were broken?

12. Give at sight:

$\frac{1}{3}$ of $6 = ?$ $\frac{1}{3}$ of $9 = ?$ $\frac{1}{3}$ of $3 = ?$

THE NUMBER TEN

9 + 1 = 10	10 − 9 = 1
2 + 8 = 10	10 − 8 = 2
7 + 3 = 10	10 − 3 = 7
6 + 4 = 10	10 − 4 = 6
5 + 5 = 10	10 − 5 = 5



1. Show with blocks all the groups of two numbers whose sum is ten.

2. From 10 take 9; take 7; 4; 5; 2; 3; 6; 8; 1.

3. Add:

2	4	3	3	2	9	6	5	1	8	7
8	6	5	7	7	1	4	5	9	2	3

4. Arrange 10 blocks in two equal groups. How many blocks are there in each group?

5. One half of 10 blocks is —— blocks.

6. Read what is printed in the oblong at the top of this page.

7. Walter had 10 cents. He spent one half of it for a pencil. How much did the pencil cost?

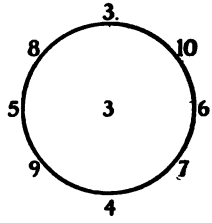
8. There are 10 children playing a game; 6 of them are girls. How many are boys?

9. A nickel equals what part of a dime?

REVIEW

1. Fill the blank spaces:

$5 + ? = 10$	$? + 7 = 10$	$10 - 5 = ?$
$10 - 8 = ?$	$10 - 6 = ?$	$7 + ? = 10$
$6 + 4 = ?$	$\frac{1}{2}$ of $10 = ?$	$2 + 8 = ?$



2. Take the number in the center from each number outside of the circle.

3. **Number Game.**

The child in the center announces the number that is to be the sum; for example, 9. She then gives one of two numbers whose sum is nine. The children in the ring give, in turn, the number that must be added to the given number to make nine. Thus, if the child in the center says 4, one child in the ring says 5, etc. When a child fails, he takes his place in the center and the child in the center joins the ring.

4. Add quickly:

4	5	4	6	3	8	5	9	10	7	6
3	3	5	4	7	2	5	1	0	3	3

TWENTY-FIVE COMBINATIONS

1. Add quickly:

1	2		2	3		3	4			
1	1		2	1		2	1			
3	4	5	4	5	6	4	5	6	7	
3	2	1	3	2	1	4	3	2	1	
5	6	7	8		5	6	7	8	9	
4	3	2	1		5	4	3	2	1	

2. Add up, then down:

6	8	6	5	5	3	4	5	3	5	4
4	2	3	2	3	2	3	4	3	5	4

3. Subtract:

7	8	9	10	8	7	6	8	7	5	9
3	5	4	6	2	4	3	4	2	3	5

4. Add:

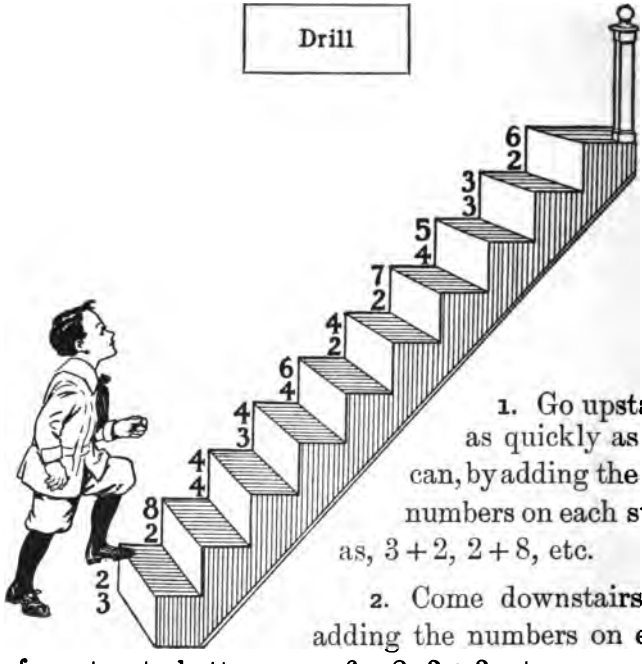
5	0	8	3	6	0	7	0	4	0	2
0	4	0	0	0	5	0	9	0	2	0

5. Subtract:

7	9	8	5	3	4	6	1	2	0	10
0	0	0	0	0	0	0	0	0	0	0

NUMBER GAMES

Drill



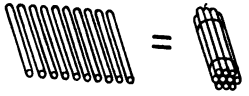
1. Go upstairs, as quickly as you can, by adding the two numbers on each step; as, 3 + 2, 2 + 8, etc.

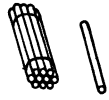
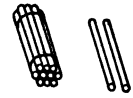
2. Come downstairs by adding the numbers on each step from top to bottom; as, 6 + 2, 3 + 3, etc.

3. Run along this pavement by subtracting the lower number from the upper number on each flagstone; as, 7 – 3, 8 – 6, 9 – 7, etc.

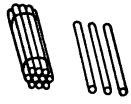
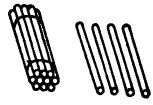
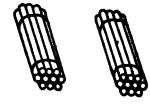
7	8	9	7	10	8	9	10	6	10	9	6
3	6	7	2	7	5	6	8	3	6	5	2

READING AND WRITING NUMBERS

 = 11, 12, 13, ··· 20 10 ones = 1 ten

eleven 11  twelve 12 

thirteen 13 fourteen 14 twenty 20

1. 13 means 1 ten and 3 ones.
2. 14 means 1 ten and 4 ones.
3. What does 11 mean? 12? 15? 20? 16? 18?
4. Write in figures the numbers from eleven to twenty.
5. Read: 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.
6. Copy:

fifteen 15 sixteen 16 nineteen 19

seventeen 17 eighteen 18

TESTS

a

1. Make a drawing to show 4 marbles less 2 marbles.

2. Write in figures: three and three are six.

3. $7+?=10$.

4. One ten and seven ones are how many?

5. Add:
$$\begin{array}{cccc} 6 & 5 & 5 & 4 \\ \underline{4} & \underline{3} & \underline{5} & \underline{5} \end{array}$$

6. Write in figures: one-half of four is two.

b

1. $\frac{1}{2}$ of $6=?$

2. Make a drawing to show $\frac{1}{2}$ of 10 balls.

3. What two numbers added together will make 9?

4. How many tens and ones make sixteen?

5. Take 2 from each number from 3 to 7.

6. Write 16 and 19 in words.

c

1. Subtract:
$$\begin{array}{ccc} 9 & 7 & 8 \\ \underline{4} & \underline{2} & \underline{4} \end{array}$$

2. $5+3=?$

3. Write in figures: six less two are four.

4. Make a drawing to show 2 boys and 2 boys.

5. Mary had 10 cents. She paid 4 cents for a pencil. How much had she left?

6. $\frac{1}{2}$ of $10=?$

d

1. $4+5=?$

2. Draw 7 apples in two groups.

3. $\frac{1}{2}$ of $8=?$

4. What number and 2 are 9?

5. Subtract 3 from each number from 4 to 8.

6. Draw the number of pencils that must be added to 10 pencils to make 15.

SECOND GRADE — SECOND HALF

READING AND WRITING TENS AND ONES

The figure **0** is called **naught** or **zero.** It stands for **nothing.** When placed to the right of 1, as in 10, the figures stand for *ten;* when placed to the right of 2, as in 20, the figures stand for *twenty;* 30 represents *thirty;* 40, *forty;* 50, *fifty;* 60, *sixty;* 70, *seventy;* 80, *eighty;* 90, *ninety.*

The right-hand figure in a number is called **ones'** figure; the second figure is called **tens'** figure. Thus, 14 is 1 *ten* and 4 *ones;* 21 represents *twenty-one.*

1. Read: 14 25 48 59 64 70 91 40

2. Read the numbers in each column, beginning at the top; at the bottom.

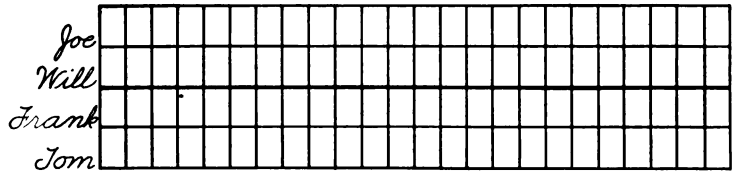
3. Read the numbers in each row, beginning at the left.

4. Write all the numbers having 7 in tens' place; 6; 0; 1; 5; 2; 3; 9; 8; 4.

0	10	20	30	40	50	60	70	80	90
1	11	21	31	41	51	61	71	81	91
2	12	22	32	42	52	62	72	82	92
3	13	23	33	43	53	63	73	83	93
4	14	24	34	44	54	64	74	84	94
5	15	25	35	45	55	65	75	85	95
6	16	26	36	46	56	66	76	86	96
7	17	27	37	47	57	67	77	87	97
8	18	28	38	48	58	68	78	88	98
9	18	29	39	49	59	69	79	89	99

COUNTING

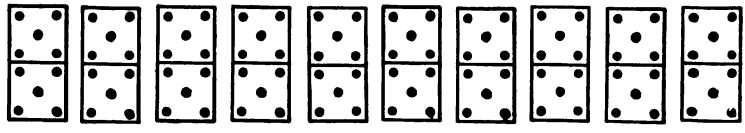
2,	4,	6,	8,	10, etc.
5,	10,	15,	20,	25, etc.
10,	20,	30,	40,	50, etc.



1. In this score card, how many spaces are there for Joe's record? Count them.

2. How many spaces are there for Joe and Will together? Count them by twos.

3. How many spaces are there for Frank and Tom together? for all four boys? Count them by twos.



4. Count the dots on the dominoes by fives; by tens.

5. Count these dimes by tens and tell how many cents they equal.

6. How many cents do twenty nickels equal?

ROMAN NUMBERS TO TEN

I	V	X

The Romans wrote their numbers with letters. This is how they wrote the first ten numbers:

1	2	3	4	5
I	II	III	IV	V
6	7	8	9	10
VI	VII	VIII	IX	X

1. Write the Roman number for six.

2. Show what change in the letters will make four.

3. What two letters are placed to the right of V to make seven?

4. What two letters are used in making the Roman number nine? How are they placed?

5. Read the following numbers:

V, IX, IV, III, VII, X, VI

6. Write the Roman number for two; for eight; for one.

7. Write the Roman numbers from 1 to 10.

8. What Roman number do you sometimes see on a nickel? What does it tell about the value of the nickel?

THE NUMBER ELEVEN

9	8	7	6
2	3	4	5
11	11	11	11

$10+1=11$

1. Nine and one are ten. Eleven is one more than ten. Nine and two are eleven.

2. Eight and two are ten. Eleven is one more than ten. Eight and three are eleven.

3. $7+?=10$
   $7+?=11$

4. $6+?=10$
   $6+?=11$

5. Add:

2	8	6	7	3	9	10	4	6	8	5
9	2	5	4	7	2	1	7	4	3	6

6. Subtract:

11	11	11	11	11	11	11	11	11	11	11
9	1	3	6	2	5	0	4	8	7	10

7. Give the missing numbers:

$4+4+?=11$ $5+2+?=11$ $6+5+?=11$

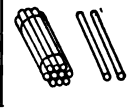
8. Tom had 8 agates and 3 flints. How many marbles had he in all?

9. Frank won 4 of Tom's marbles. How many had Tom left?

10. Make problems about 9 oranges and 2 oranges; about 7 boys and 4 boys.

THE NUMBER TWELVE

9	8	7	6	$\frac{1}{2}$ of 12 = 6
3	4	5	6	
12	12	12	12	$\frac{1}{3}$ of 12 = 4



10 + 2 = 12

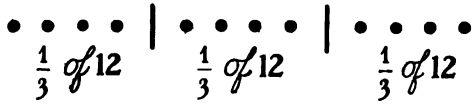
1. Nine and one are ten. Twelve is two more than ten. Nine and three are twelve.

2. Eight and two are ten. Twelve is two more than ten. Eight and four are twelve.

3. 7 + ? = 10 4. 7 + ? = 12 5. 6 + ? = 10 6. 6 + ? = 12

7. 

$\frac{1}{2}$ of 12 = 6

8. 

$\frac{1}{3}$ of 12 = 4

9. 12 is how many more than 8? 10? 7? 2? 6?

10. Add:

4	5	8	7	9	6	2	7	6	1	3
8	7	3	4	3	5	10	3	6	11	9

11. Subtract:

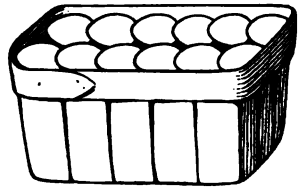
12	12	12	12	12	12	12	12	12	12
9	8	6	4	2	11	3	5	7	10

12. How many are $\frac{1}{3}$ of 12 chocolate candies?

13. Make a problem about $\frac{1}{2}$ of 12 buttons.

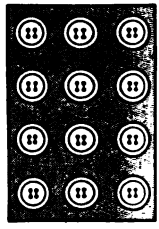
DOZEN

12 things = 1 dozen



1. Count the eggs that you see in this basket.

2. What name is sometimes given to 12 eggs? to 12 pins?



3. How many buttons are on this card?

4. How many eggs are there in the first row in the basket?

5. Six eggs are one half dozen eggs.

6. How many buttons are there in half a dozen?

7. Arrange a dozen blocks in a row.

8. Draw half a dozen apples.

9. John bought half a dozen oranges. How many oranges did he buy?

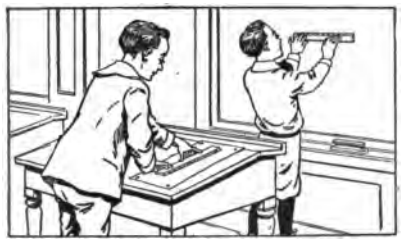
10. I have four pencils. How many more do I need to make half a dozen?

11. Sarah gave her mother a dozen roses. How many roses did she give to her mother?

12. Eggs are 30 cents a dozen. How many eggs can you buy for 30 cents?

13. Name five things that are sold by the dozen.

INCH AND FOOT



Examine a foot rule. Observe that it is divided into twelve equal spaces. Each space is called one inch.

A **foot** rule is therefore **12 inches** long.

The following represents a foot rule, although it is only one fourth the real length.

1. Count the number of inch spaces.

2. Cut from cardboard a foot rule and mark the inches on it.

3. With the rule, draw a line 1 inch long; 4 inches long.

4. Draw an oblong 12 inches long and 8 inches wide.

5. John is 3 feet and 6 inches tall. Measure on the wall and show his height.

6. Mark off with the rule on the blackboard a line 1 foot in length; 2 feet in length.

7. Without using the rule, draw a line 1 foot long. Measure it and see whether it is correct.

8. Estimate the length of your desk. Measure it and see whether you are correct.

MEASURING LENGTH

3 feet = 1 yard

1. Measure a yard stick with your foot rule.

2. One yard is equal to how many feet?

3. Name five things that are sold by the yard.

4. Tell how the storekeeper measures a yard of calico or a yard of ribbon or of lace.

5. Measure with a yard stick and draw a line on the blackboard 1 yard in length; 2 feet in length; 1 foot in length.

6. Measure with a yard stick the length of the classroom. Tell the length in yards and feet.

7. How wide do you think the classroom is? Measure the width and tell whether your answer is correct.

8. Measure the width of the windows; the height of a pupil's desk; the height of the teacher's desk; the width of a door; the distance of a blackboard from the floor.

9. Find the height in feet and inches of the tallest boy in the class.

10. Draw on the blackboard, without measuring, three lines, — one an inch in length, one a foot, and one a yard. Test these lines with a yard stick.

11. How many inches are there in $\frac{1}{2}$ of a foot? in $\frac{1}{3}$ of a foot?

ADDITION

Add rapidly:

	a	*b*	*c*	*d*	*e*	*f*	*g*
1.	2	3	9	6	8	3	4
	1	2	1	7	5	5	5
	4	5	4	2	4	2	3
	6	4	3	3	2	8	6
2.	9	6	2	4	3	4	3
	2	3	1	5	8	6	7
	7	6	7	4	6	5	8
	3	4	5	2	9	4	4
3.	7	6	8	7	5	7	9
	0	5	8	2	2	6	0
	3	0	6	3	3	5	8
	8	9	0	6	8	4	0
4.	3	3	7	9	4	8	5
	0	3	2	0	5	9	0
	6	5	8	4	0	6	9
	3	7	3	3	7	0	6
5.	9	8	7	6	5	4	3
	3	0	5	2	5	6	0
	4	3	0	2	5	6	0
	4	5	3	0	5	3	9

MULTIPLYING BY 2

$2 \times 1 = 2$	$2 \times 4 = 8$	$1 \times 2 = 2$	$4 \times 2 = 8$
$2 \times 2 = 4$	$2 \times 5 = 10$	$2 \times 2 = 4$	$5 \times 2 = 10$
$2 \times 3 = 6$	$2 \times 6 = 12$	$3 \times 2 = 6$	$6 \times 2 = 12$

1. Count by 2's to 12.

2. Two flags taken two times are —— flags. 2×2 flags = —— flags.

The sign $\times$ is read **time** or **times**.

3. Take 3 splints 2 times. 2×3 splints = —— splints.

4. Take 2 splints 3 times. 3×2 splints = —— splints.

Notice that $2 \times 3 = 3 \times 2$.

5. Take 4 flags 2 times. 2×4 flags = —— flags. 4×2 flags = —— flags. $2 \times 4 = 4 \times ?$

6. Make a drawing showing two times five eggs.

7. 2×5 eggs = —— eggs. 5×2 eggs = —— eggs.

8. Read and state the answers:

$2 \times 5 = ?$ $2 \times 3 = ?$ $2 \times 4 = ?$ $2 \times 6 = ?$ $6 \times 2 = ?$

9. If a top costs 3 cents, how much will 2 tops cost?

10. How much must I pay for 3 two-cent stamps?

11. Tell the cost of 2 cards at 6 cents each.

PROBLEMS FOR REVIEW

1. Mary has 11 cents. She spends 5 cents. How many cents has she left?

2. Helen bought a spool of thread for 5 cents and a ball of tape for 2 cents. How much change should she receive from a dime?

3. A farmer had 9 cows. After selling 4 cows, how many had he left?

4. Clara bought a pad for 7 cents and a pencil for 5 cents. How much did she pay for both?

5. Anna had 12 towels to iron. When she had ironed 9, how many were left to iron?

6. Lucy had 12 roses and gave Mary 5 roses. How many roses had Lucy left?

7. Harry found 12 eggs in the barn. If 7 of the eggs were brown and the others were white, how many white eggs did he find?

8. Mother made 2 cakes. She used 3 eggs for each. How many eggs did she use for both cakes?

9. If she had 12 eggs at first, how many were left?

10. What part of the 12 eggs were left?

11. If a hat costs 4 dollars, how much will 2 hats cost?

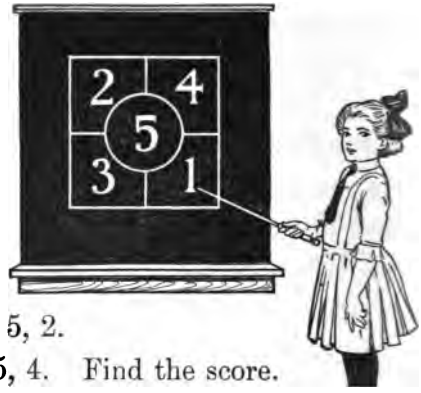
12. Make problems about:

2×6 cents.	2×4 cakes.
2×2 horses.	2×5 dollars.
$\frac{1}{2}$ of 12 peaches.	$\frac{1}{3}$ of 12 cars.

NUMBER GAMES

Blind Man's Number Board

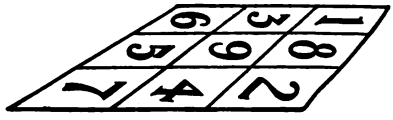
NOTE. Players close their eyes and point three times. Touching a line counts 0.



1. Ella's record is 2, 0, 3. Find the score.
2. Find John's score. His record is 5, 1, 2.
3. What is Will's score? His record is 3, 5, 2.
4. Ned's record is 3, 5, 4. Find the score.
5. What is Tom's score? His record is 4, 1, 2.
6. Who won?
7. Who had the lowest score?

Pitching Circles

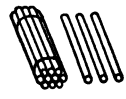
NOTE. This game is to be played on the playground or at home. Keep a score. Each player pitches three circles. A circle touching any line counts 0.



1. Fred's record is 8, 0, 4. Find his score.
2. Ruth's record is 0, 9, 3. Find her score.
3. Dick's record is 6, 4, 1. Find his score.
4. Mary's record is 3, 8, 1. Find her score.

THE NUMBER THIRTEEN

9	8	7
4	5	6
13	13	13



$10 + 3 = 13$

1. Nine and one are ten. Thirteen is three more than ten. Nine and four are thirteen.

2. Eight and two are ten. Thirteen is three more than ten. Eight and five are thirteen.

3. 13 is how many more than 6? 5? 10? 4? 8?

4. Add:

6	5	4	8	5	10	6	5	8	9	7
7	6	9	3	8	3	6	4	5	4	6

5. Subtract:

13	13	13	13	13	13	13	13	13
6	5	9	8	4	7	10	3	13

6. Find the sum:

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
5	5	7	2	3	4	6	1	4
4	3	0	5	3	2	2	4	3
2	3	4	3	3	3	2	5	4
1	0	2	3	3	4	3	2	2

7. Mary had a dime and 3 cents. She paid 7 cents for a loaf of bread. How much money had she left?

THE NUMBER FOURTEEN

9	8	7	$2 \times 7 = 14$
5	6	7	$\frac{1}{2}$ of $14 = 7$
14	14	14	

$10 + 4 = 14$

1. Nine and one are ten. Fourteen is four more than ten. Nine and five are fourteen.

2. Ten is two more than eight. Eight and six are fourteen.

3. $2 \times 7 = 14$ 4. $\frac{1}{2}$ of $14 = 7$

5. Copy and add:

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	
5	1	3	4	2	3	1	4	2	} 5
3	6	4	6	5	5	2	2	3	
2	3	2	0	2	1	3	2	4	} 9
3	4	5	3	5	5	4	5	5	
								14	

Add two numbers at once, as in *i*.

6. Add:

6	7	5
8	7	9

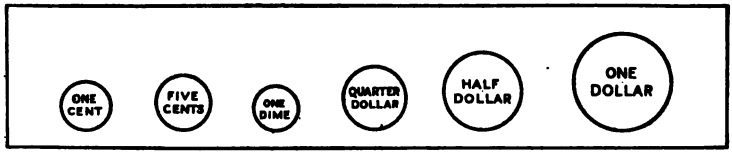
7. Subtract:

14	14	14	14	14	14	14	14	14
9	6	5	8	7	14	10		

8. How many days are there in two weeks?

9. At 14 cents a yard, how much will half a yard of muslin cost?

COINS



Secure toy money, or make circles of cardboard to represent the different pieces.

1. What other name is given to a five-cent piece?

2. What five coins equal a nickel?

3. How many nickels equal a dime?

4. Select from toy money two coins that are equal to a dollar. Name them.

5. Select four coins that are equal to a dollar.

6. How many dimes are equal to half a dollar? How many are worth a dollar?

7. Mary put three coins amounting to 25 cents into her bank. Name the coins.

8. Frank has a nickel, a dime, and 2 cents. How much money has he?

9. Joe had a quarter of a dollar. He bought 5 cents worth of candy. Name coins that would make the correct change.

With toy money make change from a quarter for:

10. Oranges for 9 cents and pears for 5 cents.

11. Popcorn for 6 cents and taffy for 4 cents.

12. Celery for 7 cents and lettuce for 5 cents.

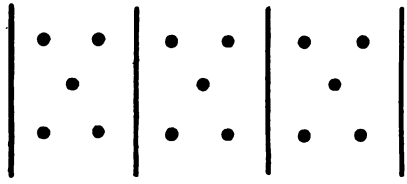
THE NUMBER FIFTEEN

9	8	$3 \times 5 = 15$
6	7	$\frac{1}{3}$ of $15 = 5$
15	15	

$10 + 5 = 15$

1. $9 + ? = 10$
   $10 + ? = 15$
   $9 + ? = 15$

2. $8 + ? = 10$
   $10 + ? = 15$
   $8 + ? = 15$

3. 

$3 \times 5 = 15$
$\frac{1}{3}$ of $15 = 5$

$\frac{1}{3}$ of 15 $\frac{1}{3}$ of 15 $\frac{1}{3}$ of 15

4. Fifteen is how many more than 9? 8? 6? 5? 7? 10?

5. Add:

9	8	7	9	6	5	7	4	9
4	7	5	5	9	8	8	7	6

6. Subtract:

15	14	13	15	15	14	15	15
9	8	9	8	5	6	6	7

THE NUMBER FIFTEEN (*continued*)

1. Add by making two groups of the four numbers:

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
3	5	6	4	5	7	2	5	2
2	2	3	3	3	1	2	4	5
4	2	2	2	1	2	2	3	3
6	5	4	6	5	5	7	3	5

2. Read and state the answers:

a	*b*	*c*	*d*
$9+6=?$	$2\times 6=?$	$8+7=?$	$2\times 7=?$
$15-7=?$	$\frac{1}{3}$ of $15=?$	$15-9=?$	$\frac{1}{2}$ of $10=?$
$8+4=?$	$\frac{1}{2}$ of $8=?$	$6+5=?$	$9+5=?$

SIXTEEN, SEVENTEEN, AND EIGHTEEN

				$2\times 8=16$
				$2\times 9=18$
8	9	9	9	$\frac{1}{2}$ of $16=8$
8	7	8	9	
16	16	17	18	$\frac{1}{2}$ of $18=9$

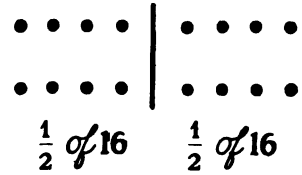
1. $10+6=16$
   $9+?=16$

2. $10+6=16$
   $8+?=16$

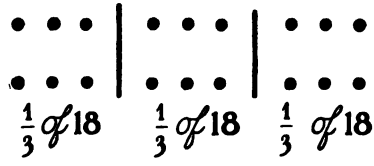
3. $10+7=17$
   $9+?=17$

4. $10+8=18$
   $9+?=18$

SIXTEEN, SEVENTEEN, AND EIGHTEEN (*continued*)



$\frac{1}{2}$ of 16 = 8



$\frac{1}{3}$ of 18 = 6

1. Add:

9	8	9	9
7	8	8	9

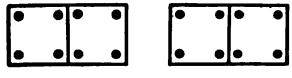
2. Subtract:

16	17	16	18	17	16	16
9	8	7	9	9	8	6

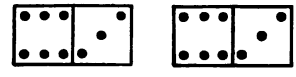
3. Make problems for the above examples.

4. Add by making two groups of the four numbers:

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
6	6	4	7	7	6	8	5	4
3	1	4	2	1	3	1	3	4
5	5	2	5	7	5	0	3	4
2	4	6	3	2	4	9	6	4



2 × 8 = ?



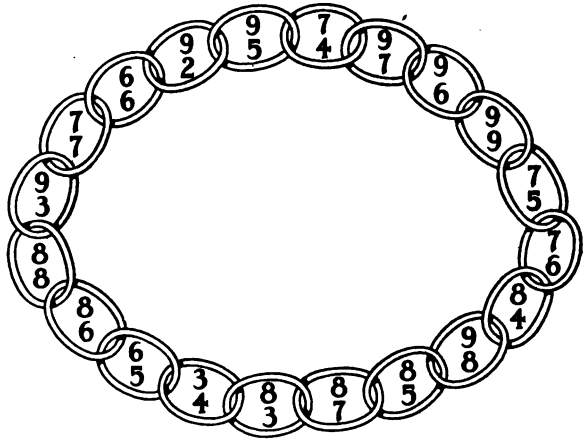
2 × 9 = ?

DRILL — ADDITION AND SUBTRACTION

1. Begin with zero and add by tens to 100, thus: 10, 20, 30, etc. Subtract by tens from 100, thus: 90, 80, etc.

2. Begin with zero and add by fives to 100, thus: 5, 10, 15, etc. Subtract by fives from 100, thus: 95, 90, etc.

3. "A chain is as strong as its weakest link." Test the strength of this chain by adding quickly the two numbers in each link.



4. Add up, then down:

a	*b*	*c*	*d*	*e*
6	9	7	6	5
5	2	6	3	4
4	3	3	4	6
3	5	4	4	2

5. Subtract quickly:

a	*b*	*c*	*d*	*e*	*f*
13	11	14	12	13	14
7	9	8	8	9	7

6.

16	12	14	18	15	12
8	7	5	9	6	6

MULTIPLYING BY 3

3 × 1 = 3	3 × 4 = 12	1 × 3 = 3	4 × 3 = 12
3 × 2 = 6	3 × 5 = 15	2 × 3 = 6	5 × 3 = 15
3 × 3 = 9	3 × 6 = 18	3 × 3 = 9	6 × 3 = 18

3 twos are 6 3 threes are 9 3 fours are 12

3 X 2 = 6 3 X 3 = 9 3 X 4 = 12

1. Count by 3's to 18.

2. Show with splints three 5's; five 3's.

Notice that $3 \times 5 = 5 \times 3$.

3. $3 \times 2 = 2 \times ?$ $3 \times 4 = 4 \times ?$ $3 \times 6 = 6 \times ?$

4. In a classroom there were 3 rows of girls and 6 girls in each row. How many girls were there?

5. How much will 3 pears cost at 4 cents each?

6. A strip of carpet is 3 yards long. What is its length in feet?

7. How many pencils are there in 3 packages, each containing half a dozen?

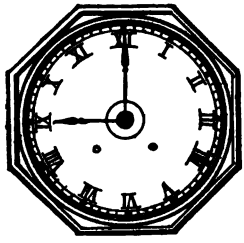
8. How much will 3 cards cost at 5 cents each?

9. John bought 6 pens at 3 cents each and gave in payment a quarter. How much change did he receive?

10. Find with splints the answers to the following:

$3 \times 10 = ?$	$3 \times 8 = ?$	$3 \times 9 = ?$	$9 \times 3 = ?$
$7 \times 3 = ?$	$3 \times 11 = ?$	$3 \times 12 = ?$	$8 \times 3 = ?$

ROMAN NUMBERS—TELLING TIME



1. Read from the clock face the Roman number for 6, 8, 9, 3, 2, 7, 5, 10, 4.

On clock faces IIII is used for IV.

2. Write in Roman numbers, 9. Show what change in the letters will make 11.

3. Read the Roman number for 12.

The short hand on the clock is called the **hour hand.** The long hand is called the **minute hand.**

4. What time is it by the clock in the picture?

5. Make a clock face of cardboard and place the hands to show nine o'clock.

6. Move the hour hand to ten. What time is it?

7. Move the hour hand to four. What time is it?

8. Place the hands to show five o'clock; two o'clock; seven o'clock.

9. Show the position of the hands at 30 minutes after 9; at 30 minutes after 10; at 30 minutes after 11.

10. What time is it when the minute hand is at VI and the hour hand between I and II?

11. Place the hands to show at what time you get up in the morning.

FOURTHS OF NUMBERS

One fourth $\frac{1}{4}$

1. // // // // Count the splints by twos.
2. How many splints are there?
3. Into how many groups are the splints divided?
4. Compare the groups as to the number in each.
5. Each group is called $\frac{1}{4}$ of 8.
6. How many splints are there in $\frac{1}{4}$ of 8 splints?
7. /// /// /// /// $\frac{1}{4}$ of 12 splints is ——
   $\frac{1}{4}$ of 12 $\frac{1}{4}$ of 12 $\frac{1}{4}$ of 12 $\frac{1}{4}$ of 12 splints.
8. What name is given to each group?
9. Put 16 splints in 4 equal groups. What is $\frac{1}{4}$ of 16?
10. How could you find $\frac{1}{4}$ of 20 children?
11. How many inches are there in $\frac{1}{4}$ of a foot?
12. How many buttons are $\frac{1}{4}$ of a dozen?
13. I divided 20 cents equally among four boys. How much did each receive?
14. What is the cost of a quarter of a pound of cheese at 16 cents a pound?
15. Margaret had 8 lemon drops. She ate $\frac{1}{4}$ of them. How many had she left?
16. Which is greater, $\frac{1}{4}$ of 8 or $\frac{1}{2}$ of 8?
17. Complete:

    $\frac{1}{4}$ of 8 = ? $\frac{1}{4}$ of 12 = ? $\frac{1}{4}$ of 16 = ? $\frac{1}{4}$ of 20 = ?

LIQUID MEASURE

Pint	Quart
2 pt.	= 1 qt.

For this exercise use real measures.

1. Fill the pint measure with water and empty it into the quart measure. Do this a second time.

You have shown that **2 pints equal 1 quart.**

2. A quart is how many times a pint?

3. A pint is what part of a quart?

4. How many times can the teacher fill Mary's half-pint milk bottle from the pint measure?

5. Charles gets a pint of milk each morning and evening. How many pints does he get in 2 days?

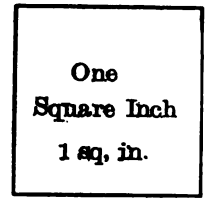
6. He pays 4 cents for a pint of milk. How much does he pay for a quart?

7. Raymond delivers each day 3 quart bottles of milk. How many pints does he deliver?

8. Henry goes to the store for 2 quarts of molasses. How many pints does he get?

9. At 6 cents a pint, how much will a quart cost?

SQUARE INCH AND FOOT



1. How many equal sides has this figure? how many square corners?

2. What is the name of the figure?

3. Measure with your rule and tell the length of each side of the square.

The whole square is a **square inch.**

4. Draw a square inch on paper.

5. Cut several square inches from cardboard.

6. Draw an oblong 3 inches long and 2 inches wide. Cover it with square inches cut from cardboard. How many square inches are needed to cover the oblong?

7. Make an oblong that will contain 8 square inches. How long is it? How wide is it?

8. Make a different oblong that will contain 8 square inches. How long is it? How wide is it?

9. Draw on the blackboard a square one foot on each side. The square that you have drawn covers one **square foot.**

10. Find the number of square feet there are in an oblong 3 feet long and 2 feet wide.

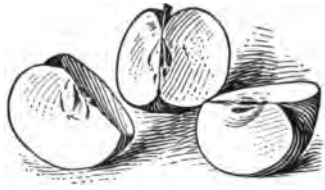
11. Cut a square foot from paper and divide it into square inches. How many square inches are there in a square foot?

HALVES, THIRDS, FOURTHS

1. Cut an apple into 2 equal parts. What is one part called?

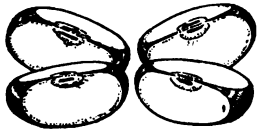
2. Into how many halves can an apple be cut? an orange? a pie?

One half of 1 is written $\frac{1}{2}$.



3. Cut an apple into 3 equal parts. What is 1 part called?

One third of 1 is written $\frac{1}{3}$.



4. Cut an apple into 4 equal parts. Each part is named one fourth, or one quarter.

One fourth of 1 is written $\frac{1}{4}$.

5. How many fourths of an apple equal a whole apple?

6. Write in figures: one half; one third; one fourth.

7. Which is greater, $\frac{1}{2}$ or $\frac{1}{4}$ of a circle?

8. $\frac{1}{2}$ is equal to how many fourths?

9. If you eat $\frac{1}{4}$ of an apple, what part of the apple is left?

10. Mother divided a pie equally among Grace, Lucy, and Tom. What part of the pie did she give to each?

11. Draw three squares and divide them into fourths, each in a different way.

DIVIDING BY 2

1. // // // // // Count the splints by 2's. How many times must two splints be taken to have 10 splints? 10 splints contain 2 splints —— times.

Show by separating into twos:

2. 6 contains 2 —— times. 8 contains 2 —— times. 12 contains 2 —— times. 14 contains 2 —— times.

The sign ÷ is read **divided by**. 4 ÷ 2 is read 4 *divided by* 2.

3. Read and give the answers:

4 ÷ 2 = ?	8 ÷ 2 = ?	12 ÷ 2 = ?	16 ÷ 2 = ?
6 ÷ 2 = ?	10 ÷ 2 = ?	14 ÷ 2 = ?	18 ÷ 2 = ?

4. At 2 dollars a pair, how many pairs of gloves can be bought for 8 dollars?

5. How many quarts are there in 10 pints of milk?

6. How many 2-cent stamps can you buy for 18 cents?

7. There were 16 eggs in a basket. Frank took them out of the basket by 2's. How many times did he take out 2 eggs?

8. I have a dozen apples. To how many boys can I give 2 apples?

9. Twenty boys are marching by 2's. How many boys are there in each file?

10. How many 2's are there in 20? in 4? in 24?

11. How many 2's are there in 24? 24 ÷ 2 = ?

DIVIDING BY 3

1. Count by 3's to 9; to 18; to 30; to 36.

2. How many times does 6 contain 3? ||| |||

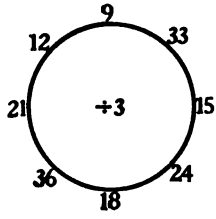
3. Show by separating into groups:

12 contains 3 —— times 15 contains 3 —— times
18 contains 3 —— times 21 contains 3 —— times

4. Give answers at sight:

9 ÷ 3	18 ÷ 3	33 ÷ 3	12 ÷ 3	27 ÷ 3
24 ÷ 3	30 ÷ 3	21 ÷ 3	36 ÷ 3	15 ÷ 3

5. Divide each number outside the circle by 3.



6. At 3 cents each, how many pencils can be bought for 21 cents?

7. Two dozen cups were arranged three in a pile. How many piles of cups were there?

8. Mary put 3 spoons at each place. She used 18 spoons. For how many persons did she set the table?

9. Among how many children could I distribute 15 plums if I gave 3 plums to each?

10. At 3 dollars a yard how many yards of silk can be bought for 27 dollars?

11. How many 3's are there in 30? in 6? in 36?

12. Divide each of these numbers by 3: 27, 18, 15, 36, 21, 9, 3, 12, 6, 24, 30, 33.

MAKING CHANGE

Secure toy money, or make circles of cardboard to represent the different pieces.

Appoint storekeepers and purchasers, and have the counting done in the schoolroom.

The sign for *cents* is ¢. Thus, 5 *cents* may be written 5¢.

These articles are for sale in a store near a large school.

Pencil 2¢	Kite 5¢
Eraser 3¢	Ball of string 4¢
Top 5¢	Bag of marbles 5¢
Whip 8¢	Pad 4¢
Hoop 9¢	Whistle 10¢
Ball 6¢	Pen 3¢
Doll 7¢	Ruler 1¢

How much change should you receive from a quarter if you bought:

1. A pencil, an eraser, and a pad?
2. A whip and a hoop?
3. A kite, a ball of string, and a bag of marbles?
4. A doll, a hoop, and a ball?
5. A pen, an eraser, a pencil, and a pad?
6. A whistle, a kite, and a ball?
7. A bag of marbles, a whip, and a kite?
8. Select as many articles as you can buy for a quarter.
9. How many pens could you buy for 9 cents?
10. How many pencils could you buy for 24 cents?

MULTIPLYING AND DIVIDING BY 2

Table of 2's

$2 \times 1 = 2$	$2 \div 2 = 1$	$2 \times 7 = 14$	$14 \div 2 = 7$
$2 \times 2 = 4$	$4 \div 2 = 2$	$2 \times 8 = 16$	$16 \div 2 = 8$
$2 \times 3 = 6$	$6 \div 2 = 3$	$2 \times 9 = 18$	$18 \div 2 = 9$
$2 \times 4 = 8$	$8 \div 2 = 4$	$2 \times 10 = 20$	$20 \div 2 = 10$
$2 \times 5 = 10$	$10 \div 2 = 5$	$2 \times 11 = 22$	$22 \div 2 = 11$
$2 \times 6 = 12$	$12 \div 2 = 6$	$2 \times 12 = 24$	$24 \div 2 = 12$

1. Memorize this table.[1]

2. Multiply these numbers by 2 from left to right and from right to left:

8, 7, 12, 4, 9, 1, 11, 6, 10, 5, 3, 2.

3. How many are three 2's? four 2's? five 2's? six 2's? seven 2's? eight 2's? nine 2's? ten 2's? eleven 2's? twelve 2's?

4. Divide these numbers by 2 from left to right and from right to left:

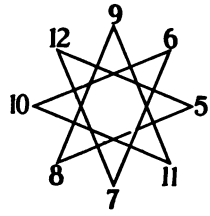
12, 18, 22, 2, 6, 16, 10, 24, 20, 8, 4, 14.

5. Copy and write the answers:

$2 \times 11 = ?$	$10 \div 2 = ?$	$16 \div 2 = ?$	$9 \times 2 = ?$
$2 \times 8 = ?$	$2 \times 6 = ?$	$4 \div 2 = ?$	$14 \div 2 = ?$
$18 \div 2 = ?$	$7 \times 2 = ?$	$22 \div 2 = ?$	$20 \div 2 = ?$
$8 \div 2 = ?$	$2 \times 10 = ?$	$5 \times 2 = ?$	$2 \times 12 = ?$

[1] From this point on, the multiplication tables will be presented in only one form. Teachers who prefer to reverse them can easily do so. Thus, 1×2, 2×2, 3×2, 4×2, 5×2, etc.

MULTIPLYING BY 2 AND 3; DIVIDING BY 3



1. Make problems, using any of the numbers on the points of the star as the cost of one article and find the cost of *two* such articles at the same price.

2. To turn this wheel, the squirrel must find the products, one after another, beginning at the bottom.

If you were the squirrel, how quickly could you turn the wheel?

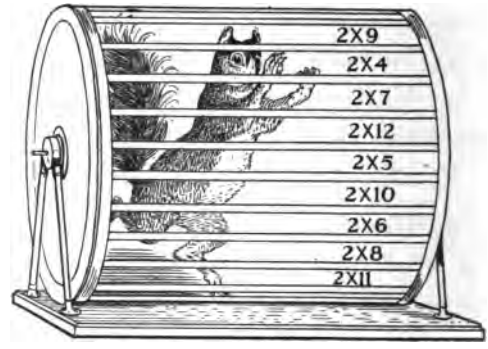


Table of 3's

$3 \times 1 = 3$	$3 \div 3 = 1$	$3 \times 7 = 21$	$21 \div 3 = 7$
$3 \times 2 = 6$	$6 \div 3 = 2$	$3 \times 8 = 24$	$24 \div 3 = 8$
$3 \times 3 = 9$	$9 \div 3 = 3$	$3 \times 9 = 27$	$27 \div 3 = 9$
$3 \times 4 = 12$	$12 \div 3 = 4$	$3 \times 10 = 30$	$30 \div 3 = 10$
$3 \times 5 = 15$	$15 \div 3 = 5$	$3 \times 11 = 33$	$33 \div 3 = 11$
$3 \times 6 = 18$	$18 \div 3 = 6$	$3 \times 12 = 36$	$36 \div 3 = 12$

Memorize this table.

MULTIPLYING BY 3

1. Multiply each of the following numbers by 3 from left to right and from right to left:

8, 7, 4, 12, 9, 6, 11, 1, 5, 10, 6, 2, 3.

2. Divide each of the following numbers by 3 from left to right and from right to left:

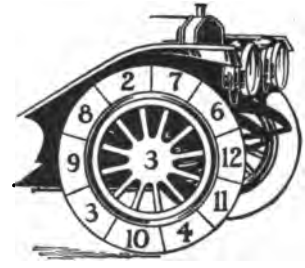
36, 21, 18, 3, 33, 24, 15, 6, 30, 27, 12, 9.

3. Read and state the answers:

$3 \times 6 = ?$	$27 \div 3 = ?$	$3 \times 10 = ?$
$12 \div 3 = ?$	$3 \times 7 = ?$	$21 \div 3 = ?$
$18 \div 3 = ?$	$3 \times 4 = ?$	$3 \times 11 = ?$
$2 \times 3 = ?$	$30 \div 3 = ?$	$15 \div 3 = ?$
$3 \times 5 = ?$	$3 \times 8 = ?$	$36 \div 3 = ?$
$9 \times 3 = ?$	$24 \div 3 = ?$	$33 \div 3 = ?$
$9 \div 3 = ?$	$18 \div 3 = ?$	$3 \times 12 = ?$

4. Select one of the above statements as $3 \times 6 = 18$ or $36 \div 3 = 12$, and make a problem that could be solved by means of it.

5. Multiply each number on the tire by the number on the hub and see how quickly you can make this automobile travel.



TESTS

a

1. $8+9=?$ $5+6=?$
2. 2×11 pints $=?$ pints.
3. How many fourths are there in a square? how many halves? how many thirds?
4. Count by 5's from 5 to 100.
5. $18-9=?$ $15-7=?$

b

1. $36\div 3=?$ $27\div 3=?$
2. $3\times 12=?$ $4\times 11=?$
3. Give the multiplication table of 2's; of 3's; the division table of 2's; of 3's.
4. Count by 10's from 10 to 100.
5. $17-8=?$ $9+8=?$

c

1. — in. = 1 ft.
2. $22\div 2=?$ $27\div 3=?$
3. Count by 2's from 2 to 36; from 1 to 35.
4. $2+3+6=?$
5. What two numbers added together make 6? 7? 8? 9? 10? 11?

d

1. — ft. = 1 yd.
2. $3\times 6=?$ $2\times 9=?$
3. Count backwards by 2's from 36 to 0.
4. $30\div 10=?$
5. What two numbers added together make 12? 13? 14? 15? 16? 17? 18?

e

1. $2+3+5+6=?$
2. $17-9=?$ $18-8=?$
3. $2\times 12=?$ $2\times 11=?$
4. $8+7=?$ $9+8=?$
5. $4+4+3=?$

f

1. $14-5=?$ $11-7=?$
2. $30\div 10=?$ $30\div 3=?$
3. $13-5=?$ $13+5=?$
4. $9+?=13$; $11-?=7$.
5. $16-9=?$ $7+9=?$

THIRD GRADE—FIRST HALF*

READING AND WRITING NUMBERS

1. One hundred one is written 101. Write in figures: one hundred four; one hundred seven.

2. Read; then write in words: 103, 105, 107, 109.

3. Add 100 to 100. The sum is two hundred, written 200. Add 200 to 100. The sum is 300.

4. Read; then write in words: 400, 500, 601, 700, 802, 900, 501, 404.

Read; then write from dictation:

	a	*b*	*c*	*d*	*e*
5.	109	309	506	836	707
6.	110	310	340	741	888
7.	112	311	765	952	999

The largest number that can be written with three figures is 999. The next number is one thousand, written 1000.

The first figure on the right is called the **ones'** figure; the next is called the **tens'** figure; the next is called the **hundreds'** figure; the next is called the **thousands'** figure. The **tens** are always read as so many **ones**. Thus, 625 is read, "6 hundred 25." In 25, the 2 tens are read as 20.

* A careful review of the second year's work should be given before this work is begun.

READING AND WRITING NUMBERS

Write in figures:

1. Twenty-five; two hundred twenty-five; three hundred fifty.

2. Four hundred two; seventy-three; nine; five hundred sixty.

3. Four hundred twenty; six hundred six; five.

4. Six hundred ninety; ten; three hundred; two hundred four.

5. Two hundred eighty; nineteen; six; one thousand.

Read; then write from dictation:

	a	*b*	*c*	*d*	*e*	*f*	*g*
6.	305	542	740	8	70	79	500
	79	67	90	48	84	342	7
	6	500	708	600	395	9	48
	394	9	502	540	4	805	6
7.	562	807	60	536	28	42	62
	9	58	547	67	906	790	203
	645	6	44	25	627	7	636
	834	526	782	981	8	856	93
8.	390	300	29	6	602	90	67
	59	5	330	306	74	67	500
	508	794	57	27	909	80	395
	74	896	8	407	40	395	70
	380	25	901	92	29	74	5

READING AND WRITING NUMBERS

Read; then write from dictation: —

	a	*b*	*c*	*d*	*e*	*f*
1.	234	230	101	231	301	243
	326	325	304	405	226	206
	434	265	376	568	304	306
2.	405	304	604	400	291	905
	304	349	787	697	743	634
	296	200	342	345	456	393
3.	623	344	23	509	20	502
	5	593	906	5	102	205
	340	25	25	820	67	50
4.	708	931	68	7	423	791
	55	67	834	751	92	8
	634	8	436	534	899	958

5. Write the first twelve Roman numbers from memory.

6. Copy the following numbers:

13	14	15	16	17	18	19	20
XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX

7. Read the following Roman numbers:

XIX	XIII	XVIII	VII	XII
XVII	XI	XX	IV	XIV
IX	VIII	V	XVI	XV

8. Write the Roman numbers for 23, 25, 22, 21, 24.

ADDITION

Add rapidly:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*
1.	5	4	3	2	1	9	8	7	6	5	8	3	2	1
	9	8	6	3	2	0	5	2	7	3	7	5	3	9
	0	1	2	5	6	2	6	7	9	0	3	7	3	0
	1	8	0	4	3	6	1	6	8	3	9	8	0	1
2.	8	3	6	8	5	6	3	8	4	3	4	6	5	7
	7	6	5	0	5	9	8	1	5	9	6	0	8	6
	2	5	9	9	8	2	7	3	2	9	3	8	9	5
	6	9	3	1	0	4	3	7	1	0	5	9	4	3

3. State sums at sight:

75	82	74	62	50	41	53	64	30	72
2	2	2	2	2	2	2	2	2	2

4. Add 3 to each number above instead of 2; then 4.

5. Add:

85	65	75	55	45	63	73	93	43	83
2	2	2	2	2	2	2	2	2	2

6. Add 3 to each number above instead of 2; then 4.

7. Find the sum of:

5 apples and 63 apples
7 cakes and 42 cakes
81 lemons and 7 lemons
24 boys and 5 boys
32 chairs and 6 chairs
47 books and 2 books

ADDITION

1. There are 54 houses on one street and 8 on another. How many are there on both streets?

$$\begin{array}{r} 54 \text{ houses} \\ 8 \text{ houses} \\ \hline 62 \text{ houses} \end{array}$$

Write *ones* under *ones* and *tens* under *tens*. Add the ones' column. The sum is 12 ones, or 1 ten and 2 ones. Write the 2 under the ones' column and add the 1 ten to the tens' column. 1 ten + 5 tens = 6 tens. The answer is 62 houses.

The process of uniting two or more numbers to form one number is called **addition**.

The answer in addition is called the **sum**.

2. A boy spent 25 cents for a book and 8 cents for a pad. How much did he spend for both?

3. Add:

59	49	69	38	88	36	47	42	54	48
3	3	3	4	4	5	4	9	6	5

4. A carpenter had 27 men and hired 9 more. How many had he then?

Give answers quickly:

5.	5+4	15+4	25+4	35+4	45+4	85+4
6.	4+3	24+3	44+3	64+3	74+3	84+3
7.	6+5	36+5	46+5	66+5	56+5	76+5
8.	8+4	28+4	38+4	48+4	68+4	88+4

ADDITION

Sight Drill

Add the two numbers in each square.

1	5 4	15 4	25 4	35 4	45 4	11	6 4	56 4	66 4	76 4	86 4
2	7 4	17 4	27 4	37 4	47 4	12	8 4	58 4	68 4	78 4	88 4
3	9 4	19 4	29 4	39 4	49 4	13	5 5	55 5	65 5	75 5	85 5
4	6 5	16 5	26 5	36 5	46 5	14	7 5	57 5	67 5	77 5	87 5
5	8 5	18 5	28 5	38 5	48 5	15	9 5	59 5	69 5	79 5	89 5
6	6 6	16 6	26 6	36 6	46 6	16	7 6	57 6	67 6	77 6	87 6
7	8 6	18 6	28 6	38 6	48 6	17	9 6	59 6	69 6	79 6	89 6
8	7 7	17 7	27 7	37 7	47 7	18	8 7	58 7	68 7	78 7	88 7
9	9 7	19 7	29 7	39 7	49 7	19	8 8	58 8	68 8	78 8	88 8
10	9 8	19 8	29 8	39 8	49 8	20	9 9	59 9	69 9	79 9	89 9

NOTE.—Drill for accuracy and speed.

Test for speed by timing pupils. For example, note the number of sums a pupil can give in one minute. Encourage each pupil to try to beat his own record.

PRACTICAL PROBLEMS

1. A desk cost 24 dollars and a chair 7 dollars. What was the cost of both?

2. Frank sold 26 heads of lettuce from his garden on Monday, and 8 heads on Tuesday. How many heads of lettuce did he sell in the two days?

3. A boy made 44 cents by selling papers after school and 8 cents on Saturday morning. How much did he make during the week?

4. Fanny had 42 cents left after spending 5 cents for candy. How much money had she at first?

5. What is the distance in time between Will's home and the school, if it takes him 7 minutes to walk to the station and he rides for 25 minutes on the train?

6. The gardener planted 9 strawberry plants in one row, 8 in another, and 7 in a third row. How many plants were there all together?

7. Ruth bought a quart of ice cream for 35 cents and some little cakes for 7 cents. How much did she pay for both?

8. Four boys were sharpening pencils. One sharpened 5, another 8, another 6, and another 2. How many pencils did they sharpen all together?

9. In a school playground there were 18 boys and 9 girls. How many children were there in the playground?

SUBTRACTION

Give differences:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*
1.	7	6	5	4	13	8	9	11	10
	4	5	2	3	8	4	5	3	3
2.	13	6	8	9	7	10	12	11	8
	6	3	3	7	2	7	4	5	2
3.	8	9	7	15	5	12	11	17	8
	6	8	5	7	4	9	7	9	7
4.	9	13	8	9	10	12	11	12	7
	6	5	5	2	8	7	4	6	6
5.	13	14	10	12	9	10	11	12	15
	9	8	9	2	3	4	8	8	8
6.	16	15	13	14	15	16	14	12	11
	8	9	7	7	6	9	9	3	6

Give answers quickly:

7.	9 − 5	49 − 5	59 − 5	89 − 5	69 − 5
8.	7 − 6	17 − 6	27 − 6	37 − 6	47 − 6
9.	13 − 7	23 − 7	33 − 7	43 − 7	53 − 7
10.	15 − 8	25 − 8	35 − 8	45 − 8	55 − 8
11.	26 − 9	36 − 9	46 − 9	56 − 9	66 − 9

SUBTRACTION

1. James had 48 cents. He spent 5 cents. How many cents had he then?

48 cents
5 cents
43 cents

Write *ones* under *ones* and *tens* under *tens*. 8 ones − 5 ones = 3 ones. Write the three ones in ones' place. 4 tens − 0 tens = 4 tens. The answer is 43 cents.

Test. 43 + 5 = 48.

Only **like numbers** can be subtracted.

Subtract and test:

	a	*b*	*c*	*d*	*e*	*f*
2.	44	38	56	64	49	65
	2	3	3	1	3	2
3.	58	65	68	57	69	86
	3	1	5	4	4	2
4.	77	88	75	96	87	94
	4	5	5	6	3	1
5.	67¢	59¢	88¢	97¢	76¢	85¢
	2¢	5¢	6¢	7¢	6¢	4¢

	a	*b*	*c*	*d*	*e*
6.	99 eggs	96 nuts	87 tops	79 pens	98 cups
	8 eggs	4 nuts	4 tops	8 pens	4 cups
7.	89 pads	94 caps	59 bags	97 pins	99 hats
	9 pads	1 cap	8 bags	2 pins	9 hats

8. Make and solve 50 examples like the above.

PRACTICAL PROBLEMS

1. David is 14 years old and Walter is 4 years younger. How old is Walter?

2. Edna spent 4 cents for pencils. She gave the clerk a quarter. How much change should she receive?

3. A postal clerk sold 6 postal cards one week, and 67 the next week. How many more did he sell in the second week than in the first week?

4. A man lives 68 miles from the city and has traveled 4 miles toward the city. How many miles has he still to travel?

5. Tom drove home 29 cows and Ned 8. How many more cows were there in Tom's herd than in Ned's?

6. Edna had 36 pieces in her doll's dinner set, but 5 plates were broken. How many pieces remained?

7. Mr. Wilson's farm contains 76 acres of land, which is 4 acres more than his brother's farm contains. How many acres are there in his brother's farm?

8. William rodė 29 miles on his bicycle on Thursday and 8 miles on Friday. How much farther did he ride the first day than the second?

9. Make problems about:

pupils	$	pictures	lamps	books
46 – 4	37 – 4	63 – 2	48 – 6	73 – 2
56 – 3	68 – 3	84 – 4	46 – 4	39 – 5

10. 37 children were invited to Kate's party. How many of them attended, if only 6 of them were absent?

SUBTRACTION

1. From 80 subtract 5.

80 = 8 tens + 0 ones, or 7 tens + 10 ones

5 =	5 ones
75 =	7 tens + 5 ones

Since 5 ones cannot be taken from 0 ones, take 1 ten (= 10 ones) from the 8 tens (leaving 7 tens). This 1 ten equals 10 ones. 10 ones less 5 ones equal 5 ones. 7 tens (remaining) less 0 tens equal 7 tens.

The work may be expressed thus:

$$\begin{array}{r} {\scriptstyle 7\ \ 10} \\ 8\,0 \\ 5 \\ \hline \end{array}$$

We think: "5 from 10 leaves 5; 0 from 7 leaves 7; 75."

Test. 75 + 5 = 80

The process of taking one number from another, or of finding the difference between two numbers, is called **subtraction.**

The number from which we subtract is called the **minuend.**

The number subtracted is called the **subtrahend.**

The answer in subtraction is called the **difference** or **remainder.**

Subtract, and test each result:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
2.	60	90	50	40	30	70	20	80
	7	3	8	4	9	7	5	6
3.	10	30	50	80	90	60	70	40
	3	6	5	9	7	4	8	2

SUBTRACTION

1. From 83 subtract 5.

83 = 8 tens + 3 ones, or 7 tens + 13 ones

5 = 5 ones

78 = 7 tens + 8 ones

Since 5 ones cannot be taken from 3 ones, take 1 ten (= 10 ones) from the 8 tens (leaving 7 tens) and add it to the 3 ones, making 13 ones. 13 ones less 5 ones equal 8 ones. 7 tens (remaining) less 0 tens equal 7 tens.

The work may be expressed thus: $\begin{array}{r} {}^{7}\,{}^{13} \\ 8\;3 \\ 5 \\ \hline \end{array}$

We think: "5 from 13 leaves 8; 0 from 7 leaves 7; 78."

Test. 78 + 5 = 83.

Subtract, and test each result:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*
2.	63	92	84	57	85	34	91	22
	7	9	9	8	9	7	4	7
3.	48	76	81	63	92	86	84	39
	9	7	9	4	4	8	5	9
4.	56	85	31	61	21	34	44	55
	9	7	8	7	3	6	8	6
5.	25¢	57¢	93¢	42¢	58¢	23¢	47¢	91¢
	8¢	7¢	5¢	6¢	9¢	6¢	9¢	6¢
6.	32¢	71¢	81¢	86¢	97¢	82¢	73¢	93¢
	5¢	2¢	5¢	6¢	8¢	8¢	9¢	8¢

PRACTICAL PROBLEMS

1. A dairyman had 31 quarts of milk. He sold 9 quarts to a baker. How many quarts had he left?

2. Frank's garden contained 72 square feet of land. A small bed of radishes covered 9 square feet of the garden. How many square feet of the garden were left for other vegetables?

3. A fur coat and a hat together cost 80 dollars. The hat cost 9 dollars. What was the cost of the coat?

4. A farmer had 41 cows. He sold them all but 9. How many cows did he sell?

5. Hazel had 63 cents. She mailed four letters, placing a two-cent stamp on each. How much money had she left when she had paid for the stamps?

6. Katherine bought a box of strawberries for 8 cents. How much had she left from half a dollar?

7. A grocer sold 9 quarts of molasses from a keg containing 40 quarts. How many quarts were left?

8. What number must be added to 9 to make 72?

9. Find the difference between 62 and 8.

10. The larger number is 91, the smaller number is 7. What is the remainder?

11. Subtract 9 from 71.

12. Take 6 from 63.

13. A man had 50 dollars. He paid 9 dollars for a railroad ticket. How many dollars had he left?

UNITED STATES MONEY

United States money is written in **dollars** and **cents**.

A period (.), named a "**decimal point**," is placed to the right of dollars. After the point, cents are written in two places. Thus, 5 *dollars* and 25 *cents* is written $5.25; 5 *cents* is written $.05, 42 *cents*, $.42.

1. Read: $8.40; $9.67; $3.14; $8.24; $7.05.

In addition and subtraction of United States money, *the point* must be written *under the point*, dollars under dollars, and cents under cents.

Read; then write from dictation:

2.	$3.45	$2.24	$3.14	$3.62	$2.43
3.	2 61	3.36	1.35	2.45	3.25
4.	2.43	3.25	3.41	6.11	5.13
5.	1.47	1.46	2.16	5.26	2.56
6.	3.46	3.25	3.41	6.11	5.13
7.	1.25	2.74	2.56	2.65	2.65

8. $24 + $8 = ?

$$\begin{array}{r} \$24 \\ 8 \\ \hline \$32 \end{array}$$

9. Copy and add:

$37	$42	$78	$25
6	9	4	6

10. Copy and subtract:

$40	$92	$53	$86
6	5	7	4

Write in columns:

11. $4.60, $3.28, $.42.

12. $.53, $21.40, $3.75, $5.

HALVES AND THIRDS OF NUMBERS

1. How many tens make twenty? One ten is what part of 20?

One half of *twenty* is ten.

One half of *four* is two.

What is one half of *twenty-four?*

2. $\left.\begin{array}{l}\frac{1}{2} \text{ of } 20 = 10 \\ \frac{1}{2} \text{ of } 6 = 3\end{array}\right\} \frac{1}{2} \text{ of } 26 = 13.$

3. Find in the same way $\frac{1}{2}$ of 28.

4. How many sevens are twenty-one? One seven is what part of twenty-one? $\frac{1}{3}$ of $21 = 7$.

5. How many eights are 24?

One eight is what part of 24? $\frac{1}{3}$ of $24 = 8$.

6. How many are three nines?

One nine is what part of 27? $\frac{1}{3}$ of $27 = 9$.

7. How many tens are thirty? How much is $\frac{1}{3}$ of 30?

$$\left.\begin{array}{l}\frac{1}{3} \text{ of } 30 = 10 \\ \frac{1}{3} \text{ of } 3 = 1\end{array}\right\} \frac{1}{3} \text{ of } 33 = 11.$$

8. Find $\frac{1}{3}$ of 36 by finding $\frac{1}{3}$ of 30 and $\frac{1}{3}$ of 6.

9. If I divide 39 cents equally among three boys, how much will each receive?

10. Susan divided 27 roses equally among 3 girls. How many did each receive?

11. Helen, May, and Ned divided 21 quarts of berries equally. How many did each receive?

MULTIPLYING BY 2

1. How many are two 6's? 2×6 cents = ?

$2 \times 6 = 12$ may also be written $\begin{array}{r} 6 \\ 2 \\ \hline 12 \end{array}$ $\begin{array}{r} 6 \text{ cents} \\ 2 \\ \hline 12 \text{ cents} \end{array}$

2. Multiply:

4	8	6	7	12	5	9	11	10	3
2	2	2	2	2	2	2	2	2	2

3. How many are two 34's? $2 \times 34¢ = ?$

$34 + 34 = 68$, or $\begin{array}{r} 34 \\ 34 \\ \hline 68, \text{ sum.} \end{array}$ $34¢ + 34¢ = 68¢$, or $\begin{array}{r} 34¢ \\ 34¢ \\ \hline 68¢ \end{array}$

4. A shorter process for finding two 34's is by multiplication, as follows:

$\begin{array}{r} 34 \\ 2 \\ \hline 68 \end{array}$ Write the 2 under the right-hand figure of the number to be multiplied, which is 34. Beginning at the right, say $2 \times 4 = 8$. Write 8 in ones' place in the answer. $2 \times 3 = 6$. Write 6 in tens' place in the answer. The result is 68. $\begin{array}{r} 34¢ \\ 2 \\ \hline 68¢ \end{array}$

Test by addition, $34 + 34 = 68$.

Multiply:

	a	*b*	*c*	*d*	*e*	*f*
5.	23	54	53	64	93	71
	2	2	2	2	2	2
6.	40¢	81¢	94 in.	70 qt.	63 ft.	53 yd.
	2	2	2	2	2	2

MULTIPLYING BY 3

Multiply at sight:

1.	4	2	5	7	9	8	6	10	11
	3	3	3	3	3	3	3	3	3
2.	12	20	40	30	50	70	60	90	80
	3	3	3	3	3	3	3	3	3

3. Multiply 65×3.

$$\begin{array}{r} 65 \\ 3 \\ \hline 195 \end{array}$$

3×5 ones $= 15$ ones, or 1 ten and 5 ones. Write the 5 ones in ones' place. 3×6 tens $= 18$ tens; 18 tens + the 1 ten of the 15 ones $= 19$ tens. The answer is 195.

We think: "3 times $5 = 15$; 3 times $6 = 18$; $18 + 1 = 19$." Product 195.

The result in multiplication is called the **product**.

Multiply:

	a	*b*	*c*	*d*	*e*
4.	45	75	66	74	86
	3	3	3	3	3
5.	135	105	216	308	207
	3	3	3	3	3
6.	236¢	309 yd.	237 in.	258 ft.	189¢
	3	3	3	3	3
7.	209 pt.	146 qt.	284¢	167 in.	248 ft.
	3	3	3	3	3

PRACTICAL PROBLEMS

1. If a clerk earns $44 a month, how much will he earn in 2 months?

2. How much will 2 lb. of tea cost at 40¢ a pound?

3. A girl is 14 years old. Her brother is twice as old. How old is her brother?

4. If molasses costs 14 cents a pint, how much will 2 pints cost?

Find the cost of:

5. 2 pieces of soap at 10 cents apiece.

6. 2 pounds of butter at 24 cents a pound.

7. 2 dozen lemons at 12 cents a dozen.

8. 2 yards of muslin at 11 cents a yard.

9. How many inches are there in 3 feet?

10. How far does an automobile travel in 3 hours if it travels 21 miles an hour?

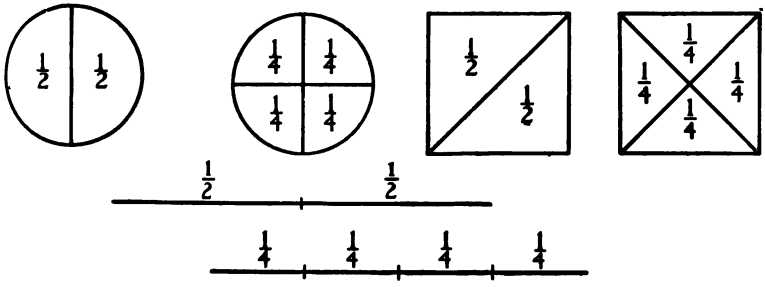
11. Tom bought 3 notebooks at 16 cents each. How much did they cost?

12. Harry sold 3 dozen eggs at 30 cents a dozen. How much did he receive for them?

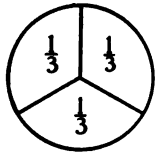
13. Find the cost of 3 rugs at 24 dollars each.

14. Three girls each bought ice cream. It cost 15 cents a plate. How much did the 3 plates of ice cream cost?

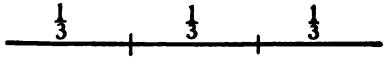
HALVES, THIRDS, AND FOURTHS

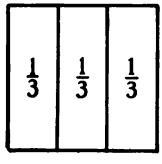


1. How many halves are there in a circle? in a square? in a line?
2. How many halves are there in a unit?
3. How many fourths are there in a unit?
4. One half is equal to how many fourths?
5. Two halves are equal to how many fourths?
6. How much greater is one half than one fourth?
7. One half and one fourth are how many fourths?
8. How many halves are there in two units?



9. How many thirds are there in one unit? in two units?
10. Two thirds and one third are how many thirds?
11. Three thirds minus two thirds are how many thirds?





DRAWING TO SCALE

Measure carefully with your ruler and draw:

1. An envelope 2 in. wide and 6 in. long.
2. A blotter 3 in. wide and 6 in. long.
3. A page 4 in. wide and 6 in. long.
4. A square 3 in. on a side.
5. A square 4 in. on a side.
6. The top of a box 5 in. on a side.
7. A picture 4 in. by 6 in.

With one inch representing a foot, draw figures to represent:

8. A rug 8 ft. long and 3 ft. wide.

NOTE.—As 1 in. stands for 1 ft., 8 in. stand for 8 ft. and 3 in. for 3 ft. Draw an oblong 8 in. long and 3 in. wide.

9. A hallway 10 ft. long and 4 ft. wide.
10. A table cover 7 ft. by 4 ft.
11. A window glass 9 ft. by 4 ft.
12. The glass for a picture 3 ft. by 2 ft.

With one inch representing a yard, draw figures to represent:

13. A room 6 yards by 4 yards.
14. A porch floor 8 yards long and 2 yards wide.
15. A hallway 12 yards long and 3 yards wide.
16. A rug 5 yards long and 3 yards wide.
17. A porch rug 4 yards long and 2 yards wide.
18. A wall 6 yards long and 3 yards in height.

DIVIDING BY 2

1. Into how many groups of 2 each may 10 be divided? 10 divided by 2 equals 5, written

$$10 \div 2 = 5, \text{ or } 2\overline{)10.}\ \ 5$$

Read, and give answers:

2. $4 \div 2$; $6 \div 2$; $8 \div 2$; $10 \div 2$; $12 \div 2$; $14 \div 2$; $16 \div 2$.

3. $2\overline{)8}$ $2\overline{)10}$ $2\overline{)6}$ $2\overline{)12}$ $2\overline{)14}$ $2\overline{)16}$ $2\overline{)18}$

4. Divide 24 by 2.

$2\overline{)24}$
$\ \ 12$

2 is contained in 2 tens, 1 ten time; write 1 in tens' place. 2 is contained in 4 ones, 2 times; write 2 in ones' place. The answer is 12.

Find the answers:

	a	*b*	*c*	*d*	*e*
5.	$2\overline{)22}$	$2\overline{)24}$	$2\overline{)26}$	$2\overline{)44}$	$2\overline{)20}$
6.	$2\overline{)28}$	$2\overline{)40}$	$2\overline{)48}$	$2\overline{)42}$	$2\overline{)46}$
7.	$2\overline{)62}$	$2\overline{)66}$	$2\overline{)60}$	$2\overline{)84}$	$2\overline{)88}$

8. How many quarts are there in 44 pints?

9. Arnold counted 84 eggs by 2's. How many times did he take out 2 eggs?

10. Milton uses 2 pages of his notebook for each day's work. How many days can he use a notebook containing 48 pages?

11. Divide by 2: 244; 462; 684; 240; 408; 800.

DIVISION AND PARTITION

1. The answer in division is called the **quotient.**

2. 24¢ ÷ 3¢ means that we are to find *how many times* 3 cents is contained in 24 cents; thus: 3¢)24¢
8 times.

Find quotients:

3. 82 days ÷ 2 days
4. 186 hours ÷ 3 hours
5. 422 minutes ÷ 2 minutes
6. 448 feet ÷ 2 feet
7. 249 inches ÷ 3 inches
8. 622 dollars ÷ 2 dollars
9. 189 years ÷ 3 years
10. 244 roses ÷ 2 roses
11. 664 cents ÷ 2 cents
12. 336 quarts ÷ 3 quarts
13. 144 dozen ÷ 2 dozen
14. 428 pints ÷ 2 pints

15. 24¢ ÷ 3 means that we are to find *one third* of 24¢; thus, $\frac{1}{3}$ of 24¢ equals 8¢, or 3)24¢.
8¢

Find quotients:

16. 224 days ÷ 2
17. 333 cents ÷ 3
18. 216 dollars ÷ 3
19. 622 birds ÷ 2
20. 326 inches ÷ 2
21. 219 hours ÷ 3
22. 444 roses ÷ 2
23. 468 minutes ÷ 2
24. 844 dozen ÷ 2
25. 646 quarts ÷ 2
26. 969 pencils ÷ 3
27. 842 books ÷ 2
28. 936 hours ÷ 3
29. 288 pages ÷ 2
30. 428 pints ÷ 2
31. 639 pens ÷ 3

DIVIDING BY 2 AND BY 3

Divide:

	a	*b*	*c*	*d*
1.	3)24	3)36	3)27	3)30
2.	3)393	3)363	3)339	3)933
3.	3¢)150¢	3 in.)900 in.	3 qt.)660 qt.	3¢)693¢

4. Compare $12 \div 2$ and $\frac{1}{2}$ of 12; $12 \div 3$ and $\frac{1}{3}$ of 12.

To find $\frac{1}{2}$ of any number, divide the number by 2.

To find $\frac{1}{3}$ of any number, divide the number by 3.

How many are:

	a	*b*	*c*
5.	$\frac{1}{3}$ of 240 men?	$\frac{1}{3}$ of 159 balls?	$\frac{1}{2}$ of 484?
6.	$\frac{1}{3}$ of 213 ft.?	$\frac{1}{2}$ of 216 plants?	$\frac{1}{3}$ of 927?
7.	$\frac{1}{3}$ of 318 yd.?	$\frac{1}{3}$ of 324 sheep?	$\frac{1}{2}$ of 806?
8.	$\frac{1}{3}$ of 915 books?	$\frac{1}{2}$ of 802 in.?	$\frac{1}{3}$ of 216?

9. A man paid 80 dollars for 2 cows. How many dollars did each cost?

10. A family bought 48 pints of milk in a month. How many quarts did they buy?

11. How many 2-cent stamps can be bought for 64 cents?

12. If a clerk earns \$88 in 2 months, how much will he earn in one month?

13. Dick had 96 cents. He spent $\frac{1}{3}$ of his money for a tie. How much did the tie cost?

NUMBER GAMES

Hard Tack

3	4	5
3	2	1

2	3	6
5	4	1

6	5	4
2	3	4

6	5	7
3	4	2

8	4	7
2	6	3

6	7	8
5	4	3

6	8	9
7	5	4

8	9	7
6	5	7

5	8	9
7	4	3

Explanation of Hard Tack

When the cards have been made and distributed, each pupil holds his cards spread out in his hand so that his neighbor cannot see them. The first child draws a card from his neighbor on the right and in turn permits his right-hand neighbor to draw a card from him. When a child holds three cards, each of which is equal to the same sum, he lays them on the table.

Hard Tack

15	16
17	18

The game continues, one child drawing from another until all the cards but one have been matched. At the end of the game the child holding the one card "Hard Tack" must give all the combinations by addition of two numbers less than ten, which make the numbers on "Hard Tack."

How Do I Know Your Answer?

Select a number less than 10. Add 3 to it.

Multiply the sum by two. Divide the product by 2.

Subtract from the quotient the number that you selected. Your answer is 3.

MULTIPLYING BY 4

1. Count by 4's to 12; to 16.

2. How many are 3 times 4? Add another 4 to the answer. How many are 4 times 4?

3. How many are 3 times 5? Add another 5 to the answer. How many are 4×5?

4. How many are 3 times 6? Add another 6 to 21. How many are 4×6?

Table of 4's

$4 \times 1 = 4$	$4 \div 4 = 1$	$4 \times 6 = 24$	$24 \div 4 = 6$
$4 \times 2 = 8$	$8 \div 4 = 2$	$4 \times 7 = 28$	$28 \div 4 = 7$
$4 \times 3 = 12$	$12 \div 4 = 3$	$4 \times 8 = 32$	$32 \div 4 = 8$
$4 \times 4 = 16$	$16 \div 4 = 4$	$4 \times 9 = 36$	$36 \div 4 = 9$
$4 \times 5 = 20$	$20 \div 4 = 5$	$4 \times 10 = 40$	$40 \div 4 = 10$

5. Memorize this table.

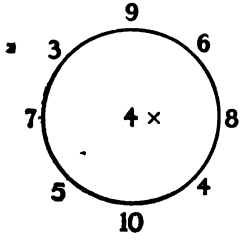
6. $4 \times 2 = 2 \times$? $4 \times 5 = 5 \times$? $4 \times 9 = 9 \times$? $4 \times 8 = 8 \times$?

7. $\frac{1}{4}$ of $20 = 5$, $\frac{1}{4}$ of $4 = 1$ } $\frac{1}{4}$ of $24 = 6$.

8. How much is $\frac{1}{4}$ of 28?

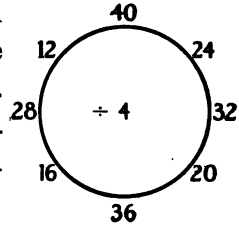
9. $\frac{1}{4}$ of $36 =$?

10. $\frac{1}{4}$ of $40 =$? $\frac{1}{4}$ of $32 =$?



11. Multiply each number outside the left-hand circle by 4.

12. Divide each number outside the right-hand circle by 4.



MULTIPLYING BY 4

1. Give products at sight:

3	5	7	9	2	10	4	6	8
4	4	4	4	4	4	4	4	4

2. 4×5 8×4 4×10 4×7 9×4

3. 5×4 4×0 4×3 7×4 4×4

4. 4×2 4×6 6×4 4×9 4×8

5. Emma had 4 pieces of ribbon of 10 yards each. How many yards had she in all?

6. How far can you ride in 4 hours in a carriage that travels on an average of 4 miles an hour?

7. At 8 cents a quart how much will 4 quarts of oil cost?

8. How many days are there in 4 weeks?

Multiply:

	a	*b*	*c*	*d*	*e*	*f*
9.	65	38	23	69	48	56
	4	4	4	4	4	4
10.	93	87	74	75	86	38
	4	4	4	4	4	4
11.	82	60	105	207	190	200
	4	4	4	4	4	4
12.	234	175	208	70	99	160
	4	4	4	4	4	4

DIVIDING BY 4

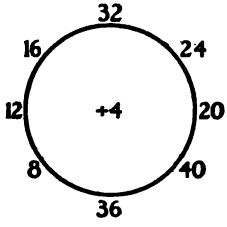
1. How many are four 2's? 4 in 8 —— times.

2. How many are four 3's? 4 in 12 —— times.

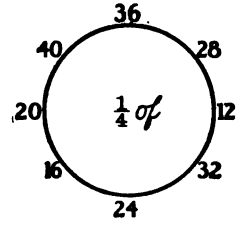
3. How many times does 16 contain 4?

4. 20 contains 4 —— times; 24 contains 4 —— times; 28 contains 4 —— times.

5. $32 \div 4 = ?$ $36 \div 4 = ?$ $44 \div 4 = ?$ $48 \div 4 = ?$



6. Give quotients.



7. Give parts.

Divide, and test by multiplication:

8. 4)44 4)48 4)844 4)804 4)404

9. 4)248 4)328 4)400 4)448 4)436

10. Find $\frac{1}{4}$ of each of the following numbers:

a	*b*	*c*	*d*	*e*
244	848	200	408	224
236	836	832	816	220
288	168	240	164	840
440	124	280	204	232

11. If the distance around a square grass plot is 824 feet, what is the length of each side?

PROBLEMS — REVIEW

1. James picked 6 quarts of berries on Monday, 4 quarts on Tuesday, 7 quarts on Wednesday, and 5 quarts on Thursday. How many quarts did he pick in the four days?

2. His mother used all but 9 quarts in making jam. How many quarts of berries did she use?

3. Find the cost of 3 rugs at 33 dollars each.

4. Jane bought 2 yards of ribbon for 84 cents. What was the price of one yard?

5. A man divided 150 dollars equally among his three sons. How much did he give to each?

6. There are 248 oranges in 4 boxes, each containing the same number. How many oranges are there in each box?

7. Ruth bought a hat for 4 dollars, a coat for 9 dollars, and a pair of shoes for 3 dollars. How much did she pay for all?

8. A farmer who had 83 chickens sold 6 of them. How many had he left?

9. An expressman bought 2 horses at 250 dollars each. How much did they both cost?

10. At 80 cents a pound, how much will half a pound of candy cost?

11. An oblong is 9 inches long and 1 inch wide. How many square inches are there in its surface?

12. Change 84 pints to quarts.

PROBLEMS — REVIEW

1. Henry's father gave him 40 cents in dimes. How many dimes did Henry receive?

2. Herbert planted 4 rows of tulip bulbs. He put 9 bulbs in each row. How many bulbs did he plant?

3. How many quarts of milk are there in 64 pints?

4. Joe received $\frac{3}{4}$ of a pie. The remainder was given to William. How much did William receive?

5. How many thirds must be added to $\frac{2}{3}$ to make a whole unit?

6. How many bows can be made from 1 yard of ribbon if it takes $\frac{1}{2}$ yard for each bow?

7. A room is 21 feet long. What is the length in yards?

8. In the number 189, which figure represents the greatest amount?

9. In the number 25, how much greater is the 2 than the 5?

10. Find the number of inches in a yard; in half a yard.

11. A farmer sold $\frac{1}{3}$ of 219 bushels of apples. How many bushels did he sell?

12. If a quarter of a yard of silk costs 36 cents what is the cost of a yard?

TESTS

a

1. $8+6+4+7=?$
2. $4\times 209=?$
3. Subtract 7 from 72.
4. Divide 800 by 4.
5. Find $\frac{1}{4}$ of 480.
6. Draw a rug 3 in. long and 2 in. wide, on a scale of 1 in. to 1 ft.

b

1. $\frac{1}{3}$ of $150=?$
2. $83-7=?$
3. $3+8+9+7=?$
4. Multiply 208 by 4.
5. 8 qt. $=?$ pt.
6. Divide a line into four equal parts. Name each part.

c

1. $26-9=?$
2. Divide 168 by 4.
3. Add 4, 6, 8, 7.
4. Find the product of 38 and 4.
5. Draw a circle and shade $\frac{2}{3}$ of it.
6. 32 pt. $=?$ qt.

d

1. $248\div 4=?$
2. 1 yd. $=?$ ft.
3. $7+8+4+6=?$
4. What is the difference between 91 and 8?
5. Write the Roman number for nineteen.
6. $3\times 296=?$

e

1. $4\times 126=?$
2. $5+8+7+6=?$
3. Find $\frac{1}{4}$ of 128.
4. Take 6 from 82.
5. $\frac{1}{2}=?$ fourths.
6. Divide 915 by 3.

f

1. 1 ft. $=?$ in.
2. $52-5=?$
3. 37 plus $9=?$
4. $3\times 247=?$
5. $47+9=?$
6. 2 units $=?$ fourths.

THIRD GRADE — SECOND HALF

READING AND WRITING NUMBERS

1. Read the following numbers:

476 109 760 987 300 954 1000

2. Add 1 to 1000. The sum is one thousand one, written 1001.

Write in figures:

3. One thousand nine.
4. One thousand six.
5. One thousand eight.
6. One thousand three.

The first figure on the right is called the **ones'** figure; the next is called the **tens'** figure; the next is called the **hundreds'** figure; the next is called the **thousands'** figure. The **tens** are always read as so many **ones**. Thus, 1625 is read, "1 thousand, 6 hundred, 25." In 25, the 2 tens are read as 20.

Read; then write:

	a	*b*	*c*	*d*	*e*
7.	1025	2040	7028	1010	8099
8.	1125	2141	9208	1011	8001

Write as one number:

9. 6 hundreds, 4 tens, 8 ones.
10. 8 thousands, 5 hundreds, 0 tens, 3 ones.
11. 4 thousands, 0 hundreds, 0 tens, 5 ones.

READING AND WRITING NUMBERS

1. Read the following numbers:

a	*b*	*c*	*d*	*e*
4372	7000	4467	5100	3131
1064	2007	9103	23	2030
2007	2510	209	2900	4659
365	8064	9023	1001	1111

2. Write from dictation:

a	*b*	*c*	*d*
4627	3040	2671	3708
2000	1005	8400	5060

3. Read:

a	*b*	*c*	*d*
$246.25	$632.75	$327.56	$805.96
318.75	738.49	928.89	613.73
92.48	918.86	738.86	928.45
18.64	29.94	198.37	56.91
$178.84	$219.35	$165.27	$214.56
6.92	7.29	86.15	3.94
175.49	216.87	283.85	69.47
862.81	938.75	395.94	138.85

ROMAN NUMERALS

1. Write the Roman numerals from 11 to 19. Place X before each. This gives the numerals from 21 to 29.

XXX = 30. L = 50. XL = 40.

2. Write the numerals from 31 to 40; from 41 to 50.

ADDITION

1. Find the sum of 22 and 37.

22
37
59

Write *ones* under *ones* and *tens* under *tens*. Add the right-hand column and place the total, 9, underneath. Add the second column and write the total underneath. The answer is 59.

Add:

	a	*b*	*c*	*d*	*e*	*f*	*g*
2.	20	30	40	50	60	30	50
	30	10	10	20	10	40	30
3.	31	21	23	32	12	30	69
	12	32	13	23	33	13	20

Add upward; test by adding downward:

4.	$45	$25	$35	$34	$42	$55	$44
	14	33	54	35	45	33	22

Only things having **like names** can be added.

	a	*b*	*c*	*d*	*e*
5.	17 boys	36 caps	56 balls	35¢	46 ft.
	12 boys	21 caps	32 balls	24¢	22 ft.

	a	*b*	*c*	*d*
6.	12 girls	34 men	14 tops	15 books
	10 girls	22 men	13 tops	20 books
	23 girls	41 men	21 tops	31 books

ADDITION

Add by columns of units and tens:

	a	*b*	*c*	*d*	*e*	*f*	*g*
1.	21	36	35	42	10	24	45
	17	10	21	11	25	23	22
2.	45	50	45	27	41	16	77
	12	21	13	10	26	12	20
3.	32	15	43	67	83	65	62
	16	13	31	11	11	22	30
4.	70	68	36	34	45	12	18
	15	10	40	22	12	14	50
5.	45¢	71¢	47¢	76¢	38¢	38¢	29¢
	20¢	13¢	31¢	10¢	40¢	20¢	50¢
6.	$56	$91	87 qt.	43 pt.	19 in.	$15	$45
	21	4	12	11	40	62	50
7.	21	17	43	15	14	26	38
	48	40	22	23	10	11	20
	30	42	24	51	74	32	40
8.	42	45	51	32	56	26	56
	24	21	17	20	21	31	22
	33	12	30	34	10	20	20

ADDITION

1. There are 54 children in one room and 28 in another. How many are there in both rooms?

54 children
28 children
82 children

Write *ones* under *ones* and *tens* under *tens*. Add the ones' column. The sum is 12 ones, or 1 ten and 2 ones. Write the 2 under the ones' column and add the 1 ten to the tens' column. 1 ten + 2 tens + 5 tens = 8 tens. The answer is 82 children.

Add and test:

	a	*b*	*c*	*d*	*e*	*f*	*g*
2.	36	47	42	54	48	35	64
	25	24	39	36	34	27	28
3.	46	19	29	18	38	17	39
	36	24	10	36	17	46	45
4.	19	21	32	23	31	42	13
	14	19	4	15	43	16	46
	3	12	16	6	8	17	18
5.	11	16	19	41	39	42	15
	31	10	20	23	20	18	41
	29	49	17	18	18	20	38
6.	30	40	32	9	8	15	13
	17	19	30	14	20	20	68
	28	34	9	16	9	38	14

7. Count by 3's to 36; to 75. By 4's to 88.

ADDITION

1. Thomas has $24 in the bank and $17 in his pocket. How many dollars has he?

2. A farmer sold 26 bushels of apples on Monday, 35 bushels on Tuesday, and 30 bushels on Wednesday. How many bushels did he sell in the three days?

3. On Tuesday a newsboy sold 28 morning papers and 44 evening papers. How many papers did he sell?

4. A girl had 42 cents left after spending 28 cents for ribbon and 10 cents for pins. How much money had she at first?

5. Mrs. Jackson spent $24 for a suit, $35 for a coat, and $12 for a hat. How much did all cost?

6. Fred planted 29 potatoes in one row, 31 in another, and 33 in a third row. How many potatoes did he plant all together?

7. Ned spent 35¢ for a ball, 25¢ for a bat, and 10¢ for car fare. How much did he spend?

8. The girls spent at the park, 15¢ for ice cream, 20¢ on the roller coaster, 35¢ in the picture gallery, and 12¢ for popcorn. How much did they spend for all?

9. It took Mary 16 minutes to sweep and dust the library, 12 minutes for the dining room, and 23 minutes for the parlor. How long did it take for the three rooms?

10. Edwin has 43 marbles, and Walter has 27 more than Edwin. How many marbles has Walter?

ADDITION

1. Add upwards rapidly. Test by adding downwards:

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*
5	4	3	2	2	9	8	7	6	5	8	5	3	9
9	8	6	3	6	2	5	7	7	3	7	7	3	1
8	8	6	5	3	6	6	6	9	3	3	8	5	7
7	6	5	4	5	6	3	8	8	3	9	6	8	6
2	5	9	8	5	9	8	3	4	9	6	8	9	5
6	9	3	9	8	4	7	7	5	9	5	9	4	3

Write from dictation; then add:

	a	*b*	*c*	*d*	*e*	*f*	*g*
2.	5	42	40	8	70	79	50
	79	67	90	48	84	42	7
	6	80	78	60	95	9	48
	94	9	52	40	4	15	6
3.	$62	$67	$60	$36	$28	$42	$62
	9	58	47	67	46	90	73
	45	6	44	25	27	7	36
	34	26	82	81	8	56	93
4.	$.59	$.05	$.29	$.36	$.47	$.67	$.95
	.58	.94	.57	.27	.99	.80	.04
	.74	.86	.08	.74	.08	.95	.23
	.80	.25	.91	.29	.20	.74	.08

5. $2+5+9+4+8=?$

6. $3+8+7+9+6=?$

SUBTRACTION

1. Drill for accuracy and speed.

14 9	9 1	13 8	12 7	13 4	16 7	5 1	10 5	4 2
8 4	3 2	17 8	4 3	7 5	6 4	2 1	5 3	16 8
8 7	12 9	11 3	10 7	18 9	9 3	11 6	15 8	11 7
6 5	14 7	7 6	10 4	8 5	7 4	12 6	10 9	6 3
11 2	15 6	9 5	10 2	14 8	9 7	12 8	8 6	13 6

Subtraction by Endings

2. Give differences:

a	*b*	*c*	*d*
11 − 2 = ?	10 − 9 = ?	17 − 8 = ?	13 − 7 = ?
21 − 2 = ?	30 − 9 = ?	27 − 8 = ?	33 − 7 = ?
41 − 2 = ?	40 − 9 = ?	37 − 8 = ?	43 − 7 = ?
31 − 2 = ?	60 − 9 = ?	57 − 8 = ?	53 − 7 = ?
71 − 2 = ?	70 − 9 = ?	77 − 8 = ?	83 − 7 = ?

e	*f*	*g*	*h*
12 − 8 = ?	13 − 5 = ?	13 − 9 = ?	12 − 7 = ?
32 − 8 = ?	23 − 5 = ?	63 − 9 = ?	22 − 7 = ?
42 − 8 = ?	83 − 5 = ?	43 − 9 = ?	42 − 7 = ?
82 − 8 = ?	33 − 5 = ?	83 − 9 = ?	62 − 7 = ?
62 − 8 = ?	93 − 5 = ?	73 − 9 = ?	52 − 7 = ?

SUBTRACTION

1. James had 48 cents. He spent 25 cents. How many cents had he then?

48 cents
25 cents
23 cents

Write *ones* under *ones* and *tens* under *tens*. 8 ones − 5 ones = 3 ones. Write the three ones in ones' place. 4 tens − 2 tens = 2 tens. The answer is 23 cents.

Test.— 23 + 25 = 48.

Only **like numbers** can be subtracted.

Subtract and test:

	a	*b*	*c*	*d*	*e*	*f*	*g*
2.	44	38	56	64	49	65	45
	22	13	13	21	23	32	23
3.	58	65	68	57	69	86	77
	33	41	15	24	34	42	33
4.	77	88	75	96	87	94	52
	44	55	25	46	53	41	40
5.	67	59	88	97	76	85	34
	52	45	56	27	36	64	30
6.	99	96	87	79	98	77	59
	38	74	64	38	84	63	50
7.	89	94	59	97	99	89	74
	19	91	18	82	29	78	24

8. Make and solve 50 examples like the above.

PRACTICAL PROBLEMS

1. Arthur is 14 years old and Alfred is 12 years younger. How old is Alfred?

2. Ruth spent 30 cents for fruit. She gave the clerk a half-dollar. How much change should she receive?

3. A boy sold 43 newspapers one day, and 67 the next day. How many more did he sell the second day than the first day?

4. A boy lives 68 miles from Trenton and has traveled 24 miles toward that city. How many miles has he yet to travel?

5. Roy had 78 marbles and Ben had 56. How many more marbles did Roy have than Ben?

6. Ethel had 78 shells, but 36 were broken. How many whole shells did she have?

7. Mr. Burton's farm contains 76 acres of land, which is 14 acres more than his neighbor's farm contains. How many acres are there in his neighbor's farm?

8. James rode 27 miles in an automobile one day and 14 miles the next day. How much farther did he ride the first day than the second?

9. Make problems about:

children	$	marbles	$	cents
46 – 14	37 – 24	63 – 12	48 – 36	73 – 21
56 – 43	62 – 31	84 – 21	46 – 24	36 – 15

10. There were 34 children in Miss Bell's class. How many of them were absent, if only 22 were present?

SUBTRACTION

1. From 80 subtract 27.

80 = 8 tens + 0 ones, or 7 tens + 10 ones
27 = 2 tens + 7 ones
53 = 5 tens + 3 ones.

The work may be expressed thus:

7	10
8	0
2	7

We think: "7 from 10 leaves 3; 2 from 7 leaves 5; 53."

Test. 53 + 27 = 80.

Subtract, and test each result:

	a	*b*	*c*	*d*	*e*	*f*	*g*
2.	40	60	20	30	50	70	90
	25	32	12	16	28	29	45
3.	30	40	80	70	50	60	80
	23	17	38	26	42	27	39
4.	90	70	80	60	40	20	50
	28	43	24	58	16	8	23
5.	40	30	70	20	90	60	50
	23	8	16	12	43	21	9
6.	80	60	50	70	80	40	30
	14	26	13	24	19	6	14

7. Make ten more problems of the same kind.

SUBTRACTION

1. From 83 subtract 35.

83 = 8 tens + 3 ones, or 7 tens + 13 ones

35 = 3 tens + 5 ones

48 = 4 tens + 8 ones.

Since 5 ones cannot be taken from 3 ones, take 1 ten (= 10 ones) from the 8 tens (leaving 7 tens) and add it to the 3 ones, making 13 ones. 13 ones less 5 ones equal 8 ones. 7 tens (remaining) less 3 tens equal 4 tens.

The work may be expressed thus:

$$\begin{array}{r} {}^{7}\,{}^{13} \\ 8\;3 \\ -\;3\;5 \\ \hline \end{array}$$

We think: "5 from 13 leaves 8; 3 from 7 leaves 4; 48."

Test. 48 + 35 = 83.

Subtract, and test each result:

	a	*b*	*c*	*d*	*e*	*f*	*g*
2.	63	92	84	57	55	34	91
	27	69	39	38	19	17	54
3.	48	81	81	63	92	86	84
	29	27	29	44	74	58	45
4.	55	93	52	53	67	92	54
	26	75	27	49	49	46	38
5.	54	42	31	65	91	43	22
	36	28	25	58	78	28	13
6.	51	93	45	21	72	56	46
	33	86	37	16	25	39	27

SUBTRACTION

Subtract, and test each result:

	a	*b*	*c*	*d*	*e*	*f*	*g*
1.	37	46	52	45	51	75	55
	29	38	39	38	42	38	46
2.	\$.37	\$.90	\$.57	\$.91	\$.53	91¢	\$.82
	.09	.27	.08	.38	.07	75¢	.49
3.	57¢	45¢	\$.23	54¢	46¢	\$.72	52¢
	29¢	29¢	.18	37¢	39¢	.49	39¢
4.	47¢	\$.23	\$.61	66¢	43¢	\$.56	65¢
	19¢	.09	.09	28¢	39¢	.09	49¢

5. John went to the picnic with 81¢ and spent in all 39¢. How much did he have left?

6. Mary picked 63 quarts of strawberries and sold to her aunt 40 quarts. How many quarts did she have left?

7. John sold 83 quarts of milk in May and 58 quarts in June. How many more quarts did he sell in May than in June?

8. In a school there are 32 girls and 19 boys. How many more girls than boys are there in the school?

9. John has read 91 pages in his reader and Mary has read 76 pages in her reader. How many more pages has John read than Mary?

10. On flag day, Susan counted 93 flags on one street and Ellen 49 flags on another street. How many more flags did Susan count than Ellen?

PRACTICAL PROBLEMS

1. Mother paid $.40 for a pound of butter, $.32 for a pound of coffee, and $.09 for a quart of milk. How much did she pay for the three articles?

2. How much money had she left from $.90?

3. Find the cost of a pair of shoes for $3.50, a cap for $.75, and a pair of gloves for $2.

4. Charles bought a quart of ice cream for $.35. How much change did he get from half a dollar?

5. Fanny put the following coins into her bank: a dime, a cent, a nickel, a quarter, and a half dollar. How much money did she put into her bank?

6. A man bought a wagon for $69, and paid $12 to have it painted. How much did the wagon cost?

7. John had a garden. In the spring he paid $.15 for seed. During the summer he sold radishes for which he received in all $.62. How much did he make?

8. A man owed a bill of $45. He paid $27 on account. How much remained to be paid?

9. Lucy and Mary together saved $.90. Mary saved $.43. How much of the money belonged to Lucy?

10. Tom bought a book for $.80, and sold it for $.55. How much did he lose?

11. Find the cost of a knife for $.50, a pen for $.25, and a pencil sharpener for $.08.

REVIEW

1. $9+7+6+4+5=?$ $8+6+9+8+3=?$

2. How many dozen eggs are there in 4 crates, each containing 30 dozen?

3. There are 144 square inches in 1 square foot. How many square inches are there in 2 square feet?

4. How many square inches are there in one half of a square foot?

5. There are 365 days in a year. How many days are there in 2 years?

6. The distance between two cities is 480 miles. How far has a man traveled when he has traveled $\frac{1}{4}$ of the distance?

7. A man picked 80 baskets of peaches. He sold all but 17 baskets. How many baskets of peaches did he sell?

8. How many trees are there in 3 orchards, each containing 27 trees?

9. A milkman sold 165 quarts of milk a week. How many quarts did he sell in 3 weeks?

10. He sold a cow for $\$48$, for which he had paid $\$70$. How much did he lose?

11. There are 60 minutes in an hour. How many minutes are there in 4 hours?

12. Write the Roman number for 27; for 31; for 42.

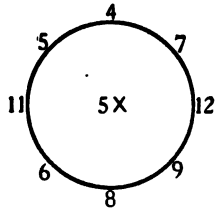
MULTIPLYING BY 5

1. Count by 5's to 20; to 25.

2. How many are 4 5's? Add another 5. How many are 5 5's?

3. How many are 4 7's? Add another 7. How many are 5 7's?

4. Multiply 11 by 5. Multiply 12 by 5.



5. Multiply each of the outside numbers by 5. Change the number within the circle to 4 and multiply; then to 3; to 2. Build the table of 5's as you built the table of 4's.

Table of 5's

$5 \times 1 = 5$	$5 \times 7 = 35$
$5 \times 2 = 10$	$5 \times 8 = 40$
$5 \times 3 = 15$	$5 \times 9 = 45$
$5 \times 4 = 20$	$5 \times 10 = 50$
$5 \times 5 = 25$	$5 \times 11 = 55$
$5 \times 6 = 30$	$5 \times 12 = 60$

6. Memorize this table.

7. Supply the missing numbers:

$2 \times 5 = ?$	5 is ? of 10
$4 \times ? = 20$	? is $\frac{1}{5}$ of 20
$5 \times 5 = ?$	25 is $? \times 5$
$? \times 5 = 35$	? is $\frac{1}{5}$ of 35
$9 \times ? = 45$	$\frac{1}{5}$ of 45 is ?

8. Give products:

8×5; 9×5; 3×5; 5×5; 7×5; 6×5; 12×5.

9. What is the difference in value between:

$3 \times \$5$ and $5 \times \$3$?

$6 \times \$5$ and $5 \times \$6$?

7×5 hats and 5×7 hats?

8×5 books and 5×8 books?

MULTIPLYING BY 6

1. Count by 6's to 12; to 24; to 48; to 60; to 72. Build the table of 6's as you built the table of 5's.

2. How many 6's are there in 12? in 18? 24? 36? 48? 54? 60? 66? 72?

Table of 6's

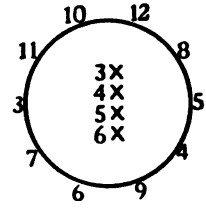
$6 \times 1 = 6$	$6 \times 7 = 42$
$6 \times 2 = 12$	$6 \times 8 = 48$
$6 \times 3 = 18$	$6 \times 9 = 54$
$6 \times 4 = 24$	$6 \times 10 = 60$
$6 \times 5 = 30$	$6 \times 11 = 66$
$6 \times 6 = 36$	$6 \times 12 = 72$

3. Memorize this table.

4. Compare:

6×2 and 2×6
6×3 and 3×6
6×4 and 4×6
6×5 and 5×6
6×7 and 7×6
6×8 and 8×6

5. Multiply each number outside the circle first by 3; then by 4; then by 5; then by 6.



Multiply by 6; by 5; by 4; by 3:

	a	*b*	*c*	*d*	*e*
6.	243	567	149	759	894
7.	679	295	293	384	839
8.	978	869	687	825	856
9.	207	890	903	708	605

10. Give products at sight:

6×40	5×20	6×80	5×50	6×61
6×70	5×35	5×32	6×25	6×42
6×90	5×41	4×71	4×92	6×81

DIVISION

1. Divide 72 by 3.

$3\overline{)72}$ 7 tens ÷ 3 = 2 tens and 1 ten

24 quotient (10 ones) remaining.

Write the 2 tens in tens' place. 10 ones and 2 ones are 12 ones. 12 ones ÷ 3 = 4 ones. Write the 4 in ones' place. Quotient 24.

We think "3 in 7, 2 times, and 1 remaining; 3 in 12, 4 times. Quotient 24."

Test. If the answer is correct, then 3×24 will equal 72, the dividend.

Divide by 2 and test:

	a	*b*	*c*	*d*	*e*
2.	34	90	472	700	364
3.	56	30	694	906	588
4.	78	58	256	502	752

$3\overline{)315}$ 105

$4\overline{)416}$ 104

Divide and test:

	a	*b*	*c*	*d*
5.	$3\overline{)621}$	$4\overline{)824}$	$2\overline{)910}$	$3\overline{)7500}$
6.	$3\overline{)384}$	$4\overline{)908}$	$2\overline{)5370}$	$4\overline{)9000}$

How many are:

	a	*b*	*c*
7.	$\frac{1}{3}$ of 540 men?	$\frac{1}{3}$ of 171 balls?	$\frac{1}{2}$ of 7484?
8.	$\frac{1}{3}$ of 717 ft.?	$\frac{1}{2}$ of 216 mi.?	$\frac{1}{3}$ of 3927?
9.	$\frac{1}{3}$ of 435 yd.?	$\frac{1}{3}$ of 384 bu.?	$\frac{1}{2}$ of 8064?

DIVISION

1. Walter had 48 baskets of fruit. He sold an equal number to 4 different buyers. How many baskets did each buy?

4)48 No. of baskets.
12 No. of baskets to each.

$\frac{1}{4}$ of 48 baskets = 12 baskets.

2. Mary has 45 cents. How many 3 cent oranges can she buy with her money?

3¢ = cost of 1 orange 3¢)45¢

15 times, or 15 oranges.

3. A man divided property valued at $369 equally among his 3 children. How much did each receive?

4. Mr. Bell earned $396 in 3 months. What were his monthly wages?

5. Find the cost of 1 bushel of wheat, if 4 bushels cost 280 cents.

6. If a girl sews 4 buttons on each pair of gloves, how many pairs has she finished when she has used 468 buttons?

7. A farmer having 96 hogs sold one third of them. How many did he sell?

8. In a car containing 639 baskets of peaches, one third were spoiled. How many baskets were spoiled?

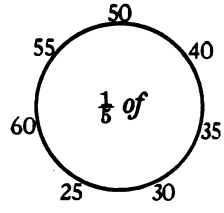
9. How many pound boxes can be filled from 164 quarter pounds of candy?

10. When molding costs 15¢ a yard, how much will 1 foot of it cost?

1 ft. = $\frac{1}{3}$ of a yard; 1 ft. will cost $\frac{1}{3}$ of 15¢, or 5 cents.

DIVIDING BY 5

1. Count by 5's to 15; to 25; to 45; to 50; to 60.
2. $?\times 5=15$ $?\times 5=20$ $?\times 5=40$



3. Give answers rapidly:

$5\div 5$	$15\div 5$	$50\div 5$	$45\div 5$
$30\div 5$	$40\div 5$	$35\div 5$	$10\div 5$
$55\div 5$	$60\div 4$	$25\div 5$	$20\div 5$

Tell the number of 5's there are, and how many remaining, in each of the following numbers:

	a	*b*	*c*	*d*	*e*	*f*	*g*
4.	16	17	46	33	18	38	21
5.	32	26	32	27	34	36	41
6.	24	29	23	19	44	39	49

Find $\frac{1}{5}$ of:

	a	*b*	*c*	*d*	*e*
7.	420 men	375 hr.	825 pt.	\$415	870¢
8.	365 horses	180 da.	315 gal.	\$630	560¢

Divide and test:

	a	*b*	*c*	*d*	*e*
9.	5)4225	5)7085	5)9275	5)4375	5)8450
10.	5)5690	5)4280	5)1365	5)7000	5)7005
11.	5)7025	5)9040	5)2750	5)4200	5)2005

DIVIDING BY 6

1. How many times is 6 contained in 12? in 18? in 24? in 48? 60? 54? 36? 66? 42? 72?

2. Give answers rapidly:

$42 \div 6$	$60 \div 6$	$36 \div 6$	$24 \div 6$	$48 \div 6$
$35 \div 5$	$48 \div 4$	$\frac{1}{5}$ of 35	$\frac{1}{6}$ of 42	$60 \div 6$
$6\overline{)48}$	$6\overline{)60}$	$6\overline{)54}$	$6\overline{)36}$	$6\overline{)30}$

Divide each number by 6:

	a	*b*	*c*	*d*	*e*
3.	480	600	624	540	366
4.	720	618	246	726	612

Complete:

	a	*b*	*c*
5.	$15 \div 6 =$ —and— over.	$6 \times 8, + ? = 50$	$6 \times 9, + ? = 59$
6.	$45 \div 6 =$ —and— over.	$? \times 6, + 2 = 56$	$6 \times ?, + 3 = 45$

Divide by 6 and test:

	a	*b*	*c*	*d*	*e*
7.	846	864	630	7242	8694
8.	672	294	840	7608	3252

9. Compare in two ways: \$18 and \$3; \$36 and \$6; 35 books and 5 books; 24 hats and 4 hats.

10. There are 96 men marching in 6 equal files. How many men are there in each file?

11. How many boxes will be needed for 108 eggs, if each box holds half a dozen?

DRILL IN MULTIPLICATION

Multiply each number by 2; by 3; by 4; by 5:

	a	*b*	*c*	*d*	*e*	*f*
1.	468	456	273	332	634	804
2.	684	654	372	233	436	972
3.	236	564	732	548	364	729
4.	632	542	412	485	184	908
5.	846	452	214	854	418	890

Multiply each number by 6; by 5; by 4; by 3:

6.	426	848	408	798	249	284
7.	264	844	840	897	942	428
8.	624	853	480	789	429	842
9.	165	790	981	679	257	912
10.	561	970	189	796	725	192

Multiply each number by 2; by 4; by 6; by 5:

11.	456	295	217	513	665	537
12.	654	925	172	135	656	357
13.	546	529	918	150	250	640
14.	237	592	189	510	520	460
15.	372	712	891	566	502	604

Multiply each number by 3; by 5; by 6; by 4:

16.	206	666	270	474	228	924
17.	620	246	720	276	282	492
18.	457	426	372	822	249	742
19.	475	642	723	726	846	952

DRILL IN DIVISION

Divide by 6:

	a	*b*	*c*	*d*
1.	672	4068	1800	1896
2.	738	4734	750	2868
3.	1404	624	2592	3360
4.	2070	1920	420	222
5.	2736	1308	390	1314
6.	3402	2436	1680	2460

Divide by 5:

7.	1725	1600	2800	2050
8.	2280	1090	2390	1095
9.	2835	2030	1580	185
10.	3390	1500	1400	560
11.	3945	625	325	615

Divide by 4:

12.	1264	1120	1624	2268
13.	1912	260	872	1824
14.	2240	280	1280	1380
15.	1640	1728	416	936
16.	876	500	3156	492

Divide by 3:

17.	2688	1461	8850	2412
18.	3678	3864	1404	3768
19.	4872	4398	3426	2634
20.	2664	4932	1884	5226
21.	3330	5466	4542	4512

DRY MEASURES

2 pints = 1 quart	2 pt. = 1 qt.
8 quarts = 1 peck	8 qt. = 1 pk.
4 pecks = 1 bushel	4 pk. = 1 bu.

PINT QUART PECK BUSHEL

1. Name some dry articles purchased by the pint; by the quart; by the peck; by the bushel.

2. Secure some sand or grain, and show by actual measurements the number of pints in a quart; quarts in a peck; pecks in a bushel.

3. Memorize the table.

4. 1 bu. = —— pecks; 1 pk. = —— quarts.

5. How many quarts equal 1 bushel?

6. $\frac{1}{4}$ pk. = —— quarts; $\frac{1}{2}$ pk. = —— quarts.

7. At 3¢ per pint, find the cost of 1 quart of nuts.

8. A horse eats 12 quarts of oats a day. How many quarts does it eat in 4 days?

9. $2\frac{1}{2}$ pk. = —— quarts; 16 qt. = —— pecks.

10. James bought $1\frac{1}{2}$ bushels of tomatoes. How many pecks did he buy?

11. If I buy $\frac{1}{2}$ peck of cherries, how many quarts should I get?

LIQUID MEASURES

1. Name some liquids sold by the pint; by the quart; the gallon.

2. Memorize this table:

2 pints = 1 quart	**2 pt. = 1 qt.**
4 quarts = 1 gallon	**4 qt. = 1 gal.**

3. 2 gallons = how many quarts?

4. From a gallon of milk how many quarts could be sold? how many pints?

5. Mrs. Adams buys 2 quarts of milk per day. How many quarts does she buy in 20 days? how many gallons?

6. At 6¢ per quart, how much does the milk cost her per week?

7. From a cask containing 3 gallons of vinegar, how many quarts could be sold?

8. How many pints are there in 12 quarts? how many gallons?

Copy these problems and insert the answers in the blank spaces:

9. 1 qt. = —— pt.
10. 8 qt. = —— gal.
11. 16 pt. = —— qt.
12. 8 gal. = —— qt.
13. 8 pt. = —— qt.
14. 4 gal. = —— qt.
15. 24 qt. = —— gal.
16. 6 pt. = —— qt.
17. 4 qt. = —— gal.
18. 5 gal. = —— qt.

MEASURES OF WEIGHT

1. Tell how the following articles are sold: butter, eggs, milk, cheese, coal.

2. Give the tables of liquid measures and dry measures.

The smallest weight in the picture is called an **ounce weight.** The largest weight is a sixteen-ounce weight, and is called a **pound weight.**

Any article that the pound weight balances weighs just **one pound.**

Use real scales or make a balance and weigh various articles.

16 ounces = 1 pound	**16 oz. = 1 lb.**

3. A lady's purchase at the store weighs 8 oz. What part of a pound does it weigh?

4. 6 oz. + 4 oz. + 6 oz. = ——— oz. = ——— lb.

5. 10 oz. + 12 oz. + 10 oz. = ——— oz. = ——— lb.

6. $\frac{1}{4}$ lb. = ——— oz. $\frac{1}{2}$ lb. = ——— oz.

7. How many 2-ounce packages weigh 1 pound?

MEASURES OF WEIGHT

1. Ask the grocer or your parents what small articles are sold by the ounce or by the pound.

2. What measure is used by the butcher?

3. Mary bought a 2-ounce package of onion seeds, a 4-ounce package of lettuce seeds, an 8-ounce package of raisins, and a 2-ounce package of flower seeds. How many pounds did she buy in all?

4. Find the cost of $1\frac{1}{2}$ lb. of steak at 28¢ a pound.

Copy and fill out:

5. 16 oz. = —— lb.
6. 1 lb. = —— oz.
7. $1\frac{1}{2}$ lb. = —— oz.
8. 8 oz. = —— lb.
9. 4 oz. = —— lb.
10. 2 lb. = —— oz.
11. $1\frac{1}{4}$ lb. = —— oz.
12. 8 × 2 oz. = —— oz.
13. 8 × 2 oz. = —— lb.
14. 20 oz. = 1 lb. and —— oz.
15. 4 × 4 oz. = —— oz.
16. 4 × 4 oz. = —— lb.

17. How many ounces are there in $\frac{1}{2}$ pound of sugar?

18. How much must I pay for a chicken weighing $2\frac{1}{4}$ lb. at 44¢ a pound?

19. Frank raises 6 pounds of onion seeds in the garden. How many ounces of seeds is that?

20. Ruth's mother buys $\frac{1}{4}$ of a pound of cheese. How many ounces should she get? How many ounces should she get if she buys $1\frac{1}{2}$ pounds?

21. Find the cost of $\frac{1}{4}$ lb. of butter at 36¢ a pound.

MEASURES OF LENGTH OR DISTANCE

1. Measure the top of your desk in feet and inches.

2. $\frac{1}{4}$ ft. = —— inches; $\frac{1}{3}$ ft. = —— inches.

3. Some articles are sold by a measure 3 times the length of a foot rule. Name some of them.

4. Draw a line on the blackboard 3 feet in length.

5. The line you have drawn is **one yard** long.

3 feet = 1 yard	3 ft. = 1 yd.

6. A piece of cloth is 6 yards long. How many feet is it in length?

Copy and fill in the blanks:

7. 3 ft. = —— in.
8. 3 ft. = —— yd.
9. 2 ft. = —— in.
10. 12 in. = —— ft.
11. 18 ft. = —— yd.
12. 3 ft. = —— in.
13. 4 ft. = —— in.
14. $2\frac{1}{2}$ ft. = —— in.
15. $3\frac{1}{3}$ yd. = —— ft.
16. 15 ft. = —— yd.
17. 7 yd. = —— ft.
18. 6 ft. = —— in.

Change:

19. 2 ft. to inches.
20. 3 ft. to inches.
21. 4 yd. to feet.
22. 6 yd. to feet.
23. 27 ft. to yards.
24. 24 ft. to yards.
25. 21 ft. to yards.
26. 12 ft. to yards
27. 24 yd. to feet.
28. 48 yd. to feet.
29. 36 yd. to feet.
30. $5\frac{1}{3}$ yd. to feet.

LENGTH AND DISTANCE

1. Ned has a row of potatoes in his garden 150 ft. long. How many yards long is it?

2. Susan lives 360 yd. from the schoolhouse. How many feet does she live from the schoolhouse?

3. A steamboat that is 960 ft. in length is how many yards long?

4. A man who is 6 ft. in height is how many inches in height? how many yards?

5. The schoolroom is 40 ft. in length. How many yards and feet over is that?

6. The schoolroom is 30 ft. in width. How many yards wide is it?

7. John is 5 ft. 4 in. in height. How many inches is he in height? Show this by the yard stick.

8. Mary sits 6 ft. from the teacher's desk. How many inches does she sit from the teacher's desk?

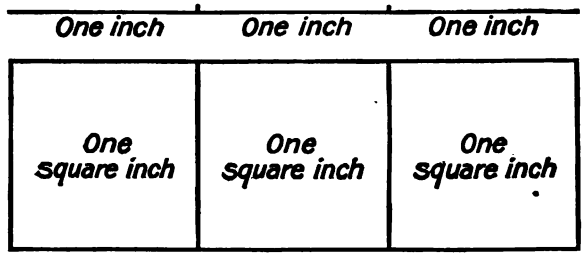
9. The schoolroom door is 3 ft. 9 in. wide. How many inches wide is the door?

10. Fred measures on his bicycle the distance that he lives from the schoolhouse and finds it to be 900 feet. How many yards is this distance?

11. Mary and Ellen measure with a tapeline the distance around the schoolhouse, and find that it is 140 ft. How many yards and feet over is this distance?

12. Mary is 4 ft. 7 in. tall. How many inches in height is she?

MEASURES OF SURFACE



1. Measure this figure with your rule. How long is it? how wide?

2. What is a square inch? How does the entire figure differ from one square inch?

A figure having square corners and longer than it is wide is called an **oblong.**

3. Cut from paper an oblong 1 inch wide and 4 inches long, and fold it to show the number of square inches in it. Do the same with an oblong 2 inches wide and 4 inches long.

4. An oblong is 5 inches long and contains 15 square inches. Draw the oblong to show the width and the number of square inches.

5. An oblong has 24 square inches. It is 6 inches long. Draw the figure on paper. Fold it to show each square inch.

6. An oblong 6 inches long and 3 inches wide will make an oblong —— inches long and 1 inch wide.

7. Show that a square containing 9 square inches is 3 inches on each side.

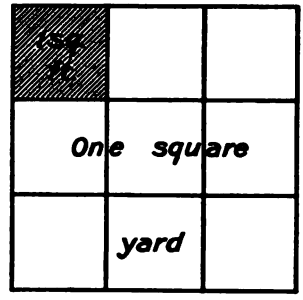
MEASURES OF SURFACE

1. Draw a square 1 inch long and 1 inch wide. What shall we call it?

2. Draw on the blackboard a square 1 foot long and 1 foot wide. Call it a **square foot.**

3. Draw on the blackboard a square 1 yard long and 1 yard wide. Call it a **square yard.**

4. Separate, by points, each side of the square yard into 3 equal parts. Connect these points by straight lines. What is the size of each square? How many square feet are there in a square yard?



5. This picture shows a square yard, smaller than it really is. How many square feet does it show?

9 square feet = 1 square yard 9 sq. ft. = 1 sq. yd.

6. Measure your desk. Decide on a convenient scale and draw a figure to represent the top of your desk.

7. Draw to a scale of $\frac{1}{4}$ in. to 1 ft. an oblong to represent the floor of a room 20 feet long and 16 feet wide.

8. Decide on a convenient scale and draw an oblong to represent a flower bed 10 feet long and 5 feet wide.

AREA

1. Draw an oblong 6 inches long and 4 inches wide. Divide it into square inches. How many square inches are there in one row? How many rows are there? How many square inches are there in the entire oblong?

$$4 \times 6 \text{ sq. in.} = 24 \text{ sq. in.}$$

2. Draw another oblong 5 inches long and 3 inches wide, and find, in the same way, how many square inches it contains.

3. Draw an oblong 5 inches long and 4 inches wide and find, in the same way, how many square inches it contains.

Notice that the number of square inches equals the product of the number of inches in the length by the number of inches in the width.

4. Find the number of square feet in the floor of your classroom.

5. How many square inches are there in a four-inch square? Illustrate.

6. How many square inches can you cut from a piece of paper 4 inches long and 4 inches wide?

7. Draw three different oblongs each containing 12 square inches.

8. A garden bed is 6 feet long and 10 feet wide. How many square feet does it contain?

9. How many square inches are there in a bureau scarf 50 in. long and 9 in. wide?

PRACTICAL PROBLEMS

1. How many pounds of sugar are there in 6 packages of 25 lb. each?

2. There are 248 pages in a book. When 89 pages are read, how many pages remain unread?

3. A barrel of flour weighs 196 pounds. How much is left after 68 pounds have been sold?

4. There are 32 quarts in a bushel. How many quarts equal 5 bushels?

5. If there are 9 school months in a year, how many school months are there in 6 years?

6. In a purse there are $3, 3 quarters, 6 dimes, 4 nickels, and 4 cents. How much money is in the purse?

7. A horse went 36 miles in 6 hours; a bicycle went the same distance in 4 hours. Find the speed of each.

8. There are 181 pupils on the second floor of a school building and 157 on the third floor. How many are there on both floors? How many more are on the second floor than on the third?

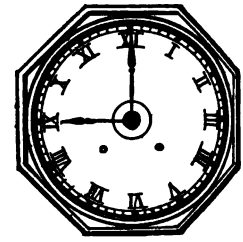
9. A bushel of shelled corn weighs 56 pounds. How many pounds are there in a box holding 6 bushels?

10. There are 144 pens in a gross. How many are there in 5 gross?

11. There are 24 sheets of paper in a quire. How many are there in 6 quires?

12. How much will 6 pounds of figs cost at 9 cents per pound?

MEASURES OF TIME



1. Name the letters on the face of the clock. Tell the time.

2. Observe the small spaces on the outer edge of the face. These are called **minute** spaces.

3. Over how many of these spaces does the minute hand move in passing around the face from XII to XII again?

4. How long is the minute hand in passing from XII to I? from V to VI? from X to XI?

5. There are the same number of minute spaces between any two hours.

6. While the minute hand passes from XII to XII again, how far does the hour hand move?

7. How many minutes are there in an hour? in 2 hr.? in 4 hr.? in $\frac{1}{2}$ hr.?

8. When the hour hand is at XII, what is the time if the minute hand points to V? to III? to I?

9. Count the hours on the clock face from 9 o'clock, the opening of school, until 9 o'clock the next morning. How many are there? These 24 hours include both day time and night time.

60 minutes = 1 hour	**60 min. = 1 hr.**
24 hours = 1 day	**24 hr. = 1 da.**

MEASURES OF TIME

The day always begins at XII, **midnight**. The time from midnight to noon is called **forenoon**. The time from XII, noon, to midnight is called **afternoon**.

We write **A.M.** for *forenoon* and **P.M.** for *afternoon*. 8:20 A.M. is read 20 minutes past eight in the morning.

1. Read 6:10 A.M.; 4:25 A.M.; 6:30 P.M.; 6:45 P.M.; 10:00 A.M.; 5:05 P.M.

2. How many hours is it from 9 A.M. to 5 P.M.? from 10 P.M. to 6 A.M.?

3. How many days is it from 9 o'clock Monday morning to 9 o'clock the next Monday morning?

7 days = 1 week 7 da = 1 wk.

1913 JULY 1913						
SUN	MON	TUE	WED	THU	FRI	SAT
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

4. On what day did Aug. 1, 1913, fall? Make a calendar for August 1913, similar to the one for July.

5. Name the months of the year, beginning with January.

12 months = 1 year 12 mo. = 1 yr.

6. How many months are there in 5 years?

7. How many days are there in 6 weeks?

8. How many hours are there in 6 days?

9. How many minutes are there in 4 hours?

MULTIPLYING BY 7

1. Count by 7's to 21; to 42; to 63; to 84.

2. $2 \times 7 = ?$ $3 \times 7 = ?$ etc., to $12 \times 7 = ?$

3. Build the table of 7's.

4. Compare in value 5×7 and 7×5; 3×7 and 7×3; 7×6 and 6×7; 7×2 and 2×7; 4×7 and 7×4.

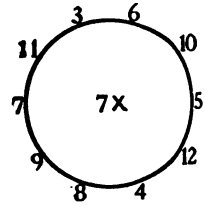


Table of 7's

$7 \times 1 = 7$	$7 \times 7 = 49$
$7 \times 2 = 14$	$7 \times 8 = 56$
$7 \times 3 = 21$	$7 \times 9 = 63$
$7 \times 4 = 28$	$7 \times 10 = 70$
$7 \times 5 = 35$	$7 \times 11 = 77$
$7 \times 6 = 42$	$7 \times 12 = 84$

5. Memorize this table.

6. What multiplicand and multiplier make:

49	12	36	28	24
35	30	14	18	14
25	42	20	27	21
63	84	77	72	54

Multiply:

	a	*b*	*c*	*d*	*e*
7.	456	265	157	963	904
	7	7	7	7	7

Multiply:

8.	7739	8497	6198	5424	6339
	7	7	7	7	7

Multiply by 7, testing answers:

9.	4693	7528	6934	8576	7935
10.	7208	5697	2469	3875	8094

DIVIDING BY 7

1. How many times is 7 contained in 14? in 21? 42? 63? 28? 35? 49? 70? 77? 56?

2. Find $\frac{1}{7}$ of 84; 63; 42; 35; 56; 70; 14; 21.

Divide:

	a	*b*	*c*	*d*	*e*	*f*
3.	7)42	7)63	7)56	7)49	7)84	7)35
4.	6)72	5)45	6)42	7)28	6)48	7)70

Divide by 7:

5.	84	56	59	68	45	36
6.	217	364	427	637	273	696

Divide and test:

	a	*b*	*c*	*d*	*e*
7.	7)2436	6)7392	7)8694	6)7854	7)4697
8.	5)2605	7)8050	6)3078	7)2093	5)8090
9.	7)7385	6)2862	7)2534	5)3205	7)6972

10. How many 7-pound boxes can be filled from 259 pounds of barley?

11. How many weeks are there in 49 days?

12. How many suits, each requiring 7 yards, can be made from a piece of cloth containing 84 yards?

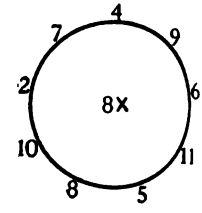
13. How many 7¢ packages of crackers can be bought for 84¢?

MULTIPLYING BY 8

1. Count by 8's to 24; to 64; to 88.

2. How many are 2×8 balls? 3×8 books? 4×8 boys? 5×8 pens? 6×8 apples?

3. Build the table of 8's to 8×11.



4. Give quickly:

6×8	8×6	7×8	5×8
8×4	8×10	8×2	8×11
8×0	4×8	8×8	8×5

Table of 8's

$8 \times 1 = 8$	$8 \times 7 = 56$
$8 \times 2 = 16$	$8 \times 8 = 64$
$8 \times 3 = 24$	$8 \times 9 = 72$
$8 \times 4 = 32$	$8 \times 10 = 80$
$8 \times 5 = 40$	$8 \times 11 = 88$
$8 \times 6 = 48$	

5. Memorize this table.

6. Give answers:

$? \times 8 = 32$	$7 \times ? = 56$
$6 \times ? = 48$	$? \times 5 = 40$
$? \times 8 = 72$	$8 \times ? = 64$
$10 \times ? = 80$	$? \times 3 = 27$
$12 \times ? = 84$	$2 \times ? = 18$

Multiply by 8:

	a	*b*	*c*	*d*	*e*
7.	6230	5178	8629	9310	7865
8.	2937	8694	9083	8697	7289
9.	9048	6937	2865	4705	8136

Give products at sight:

10.	8×50	8×70	8×91	8×12	8×31
11.	7×40	7×60	7×71	8×11	7×20
12.	8×90	7×81	8×30	7×21	8×61

DIVIDING BY 8

1. $48-8-8-8-8-8=?$ $48\div 6=?$
2. $2\times 8=?$ $16\div 2=?$ $8\times 3=?$ $24\div 8=?$ $8\times 4=?$
3. $32\div 8=?$ $40\div 5=?$ $56\div 8=?$ $64\div 8=?$ $72\div 8=?$
4. 64 contains 8 —— times 72 contains 8 —— times
5. 56 contains 8 —— times 48 contains 8 —— times
6. 80 contains 8 —— times 88 contains 8 —— times

Give quotients:

	a	*b*	*c*	*d*	*e*
7.	8)64	8)32	8)40	8)72	8)56
8.	8)16	7)56	8)24	7)63	8)48
9.	7)35	8)88	7)28	8)16	8)80

Find:

10.	$\frac{1}{8}$ of 72	$\frac{1}{8}$ of 64	$\frac{1}{8}$ of 32	$\frac{1}{8}$ of 56	$\frac{1}{8}$ of 48
11.	$\frac{1}{8}$ of 640	$\frac{1}{8}$ of 720	$\frac{1}{8}$ of 400	$\frac{1}{8}$ of 320	$\frac{1}{8}$ of 800

Divide by 8:

	a	*b*	*c*	*d*	*e*
12.	176	824	624	472	608
13.	8072	2096	3072	4088	6024
14.	2904	8104	2992	7904	8600

15. How many tablets at 8¢ each can be bought for 72 cents?

16. A furniture dealer paid 240 dollars for ice chests at 8 dollars each. How many chests did he purchase?

MULTIPLYING BY 9

1. Count by 9's to 27; to 54; to 72; to 90.

2. Build the table of 9's to 9×10.

3. Compare 6×9 and 9×6; 8×9 and 9×8; 10×9 and 9×10.

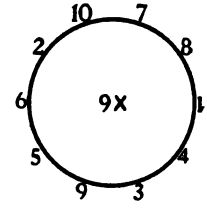
4. Multiply at sight by 9:

40 60 80 20 50 10 30 70 90 31 51 71

Table of 9's

$9 \times 1 = 9$	$9 \times 6 = 54$
$9 \times 2 = 18$	$9 \times 7 = 63$
$9 \times 3 = 27$	$9 \times 8 = 72$
$9 \times 4 = 36$	$9 \times 9 = 81$
$9 \times 5 = 45$	$9 \times 10 = 90$

5. Memorize this table.



Give two numbers that form each of these products:

6. 21, 36, 44, 48, 50, 40, 54, 45, 33, 27.

7. 88, 90, 60, 77, 81, 63, 66, 72, 56, 80.

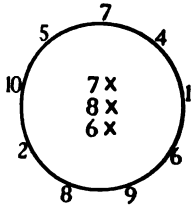
Multiply by 9:

	a	*b*	*c*	*d*	*e*
8.	4693	7286	4615	8738	6967
9.	4135	2874	6398	1869	7043
10.	8286	3697	4589	2893	9097
11.	9387	2945	9384	6356	2864
12.	6005	7894	5009	6090	7500
13.	5020	4080	3074	8005	9999

MULTIPLYING BY 9

Multiply by 9:

	a	*b*	*c*	*d*	*e*
1.	4226	8393	3786	2468	8321
2.	5483	6692	2294	8329	6245
3.	6396	2594	4968	5692	9374
4.	7278	7246	5328	7386	8928



Find the products:

5. 9×38 gal. 9×24 da. 9×16 min.

6. 9×17 bu. 9×25 mo. 9×25 horses

7. 9×12 ft. $9 \times 18¢$ 9×35 cows

8. Find products first by 7, then by 8, then by 6, of each number outside the circle.

9. State the products rapidly:

4 4	9 4	9 5	10 9	11 8	6 6	9 7	10 5	11 5
8 5	7 7	8 4	7 4	6 9	7 6	8 7	10 8	11 7
12 6	8 8	11 6	10 7	6 4	7 5	5 6	5 4	5 5
9 9	12 5	8 6	10 6	9 8	12 4	12 4	12 3	11 5

DIVIDING BY 9

1. How many tables, at $9 each, can be bought for $18? for $27? for $36? for $45? for $63?

2. Give quotients at sight:

$63 \div 9$	$81 \div 9$	$45 \div 5$	$36 \div 4$	$18 \div 9$
$72 \div 8$	$54 \div 6$	$72 \div 9$	$27 \div 3$	$90 \div 9$
$\frac{1}{9}$ of 36	$\frac{1}{7}$ of 63	$\frac{1}{9}$ of 54	$\frac{1}{8}$ of 56	$\frac{1}{9}$ of 72
$\frac{1}{8}$ of 64	$\frac{1}{9}$ of 45	$\frac{1}{5}$ of 45	$\frac{1}{9}$ of 63	$\frac{1}{7}$ of 56

3. Tell at sight which is greater and how much:

$\frac{1}{9}$ of 81 or $\frac{1}{3}$ of 27 — $\frac{1}{8}$ of 40 or $\frac{1}{9}$ of 45

$\frac{1}{8}$ of 64 or $\frac{1}{2}$ of 16 — $\frac{1}{7}$ of 63 or $\frac{1}{9}$ of 81

Divide by 9:

	a	*b*	*c*	*d*	*e*
4.	2637	1856	2934	7686	8172
5.	6381	2097	3087	6075	7236
6.	8469	3762	2988	2205	3609
7.	7587	6291	8694	2988	6093

8. Give quotients at sight:

$180 \div 9$	$360 \div 9$	$900 \div 9$	$720 \div 9$	$729 \div 9$
$279 \div 9$	$549 \div 9$	$459 \div 9$	$639 \div 9$	$450 \div 9$

9. If a postman delivers 954 letters in 9 hours, how many letters does he average in one hour?

10. How many times can 9 inches be marked off from a line $4\frac{1}{2}$ feet in length?

11. At 3 melons for 15 cents, how many melons can I buy for 45 cents?

REVIEW OF FUNDAMENTAL OPERATIONS

Answer quickly:

	a	*b*	*c*	*d*	*e*
1.	6×3	5×4	$10 - 2$	4×5	$\frac{1}{3}$ of 24
2.	7×10	6×6	$18 - 6$	4×3	$64 \div 8$
3.	9×2	8×10	$40 - 10$	7×6	$\frac{1}{6}$ of 48
4.	7×3	6×5	$\frac{1}{7}$ of 42	9×2	7×8
5.	4×7	10×9	$90 \div 9$	5×5	7×4
6.	$20 - 4$	$\frac{1}{4} \times 28$	8×3	$16 - 10$	$49 \div 7$
7.	$22 - 7$	$\frac{1}{5}$ of 20	7×6	$\frac{1}{2}$ of 24	$\frac{1}{3}$ of 36
8.	6×4	$31 - 6$	$\frac{1}{3}$ of 27	8×7	5×5
9.	4×9	3×10	$54 - 6$	9×6	$28 \div 4$
10.	5×2	$\frac{1}{5}$ of 25	8×3	$8 \div 2$	$\frac{1}{6}$ of 30
11.	8×6	$90 \div 9$	7×9	$\frac{1}{5}$ of 35	6×10
12.	8×5	4×7	$\frac{1}{3} \times 18$	$32 \div 4$	3×3
13.	3×6	$64 \div 8$	$\frac{1}{6} \times 72$	8×8	9×7
14.	$54 - 6$	$72 \div 8$	$\frac{1}{4}$ of 48	5×9	8×3
15.	$39 - 7$	9×8	$47 - 8$	$\frac{1}{4}$ of 44	$\frac{1}{6}$ of 66
16.	$\frac{1}{9}$ of 63	$72 - 9$	$81 \div 9$	$\frac{1}{5}$ of 40	$\frac{1}{6}$ of 42
17.	$\frac{1}{3} \times 36$	$10 - 2$	7×7	$\frac{1}{2} \times 18$	$\frac{1}{4}$ of 36
18.	7×8	9×9	8×7	$81 \div 9$	$56 \div 7$
19.	6×7	9×9	$\frac{1}{5}$ of 30	6×11	8×10
20.	9×10	7×12	$84 \div 7$	3×6	$44 \div 11$

REVIEW OF THIRD YEAR

1. There are 8 pints in one gallon. How many pints are there in 36 gallons?

2. A train runs 26 miles in 1 hour. How far can it run in 9 hours?

3. How much will 8 yards of cloth cost at 32 cents per yard?

4. At the rate of 9 pages an hour, how long will it take to finish a story of 27 pages?

5. At 6 cents a pound, how many pounds of sugar can be bought for 138 cents?

6. There are 168 cabbage plants in 8 rows. How many are there in each row?

7. How many bushels equal 396 pecks?

8. How many gallons equal 396 quarts?

9. How many weeks equal 287 days?

10. If 9 hours is a day's work, for how many days should a man be paid who has worked 342 hours?

11. 6 melons cost 78 cents. How much is that apiece?

12. How many yards equal 54 feet?

13. At 48 cents a gallon, what is the cost of a pint of molasses?

14. Seven o'clock A.M. is how many hours after midnight?

15. 144 square inches equal one square foot. How many square inches equal 8 square feet?

REVIEW OF THIRD YEAR

1. Tell the meaning of each figure in these numbers: 4069; 27304; 50100; 73614; 80001.

2. Express in words: 84244; 93712; 65111; 52316; XXVIII; XXXV; XLIX; LIV.

3. If you sold a person goods to the amount of 94 cents, and received $2 in payment, what coins might you give in change?

4. If I pay 96 cents for 3 yards of ribbon, how much should I pay for 1 yard?

5. Frank's expenses for one week were $7 for board, $.60 for car fare, $.48 for laundry work, and $.75 for other expenses. Find the total expenses.

6. From a box of soap containing 144 cakes a grocer sold 76 cakes. How many cakes of soap remained?

7. A man paid $600 for a lot, and built a house on it which cost $3000. What was the value of the property?

8. Mrs. White's grocery bill for January was $38, for February $35, and for March $42. What was the amount of the three bills?

9. Find $\frac{1}{7}$ of 2954; $\frac{1}{6}$ of 6354; $\frac{1}{9}$ of 8982.

10. Make a problem from the following statement:
25 yards were sold from a piece containing 52 yards.

TESTS

a

1. $9 \times 8 = ?$ $7 \times 6 = ?$
   $3 \times 9 = ?$ $7 \times 8 = ?$
2. 64 qt. = —— pk.
3. $3\frac{1}{4}$ bu. = —— pk.
4. $7854 \div 7 = ?$
   $9864 \div 9 = ?$
5. Make a diagram on a scale of 1 inch to the foot to show a rug 3 ft. by 5 ft.
6. $6+7+9+0+4 = ?$
   $8+3+6+1+5 = ?$
   $9+8+7+6+5 = ?$

b

1. $1+2+3+4+5+6+7+8+9 = ?$
2. $84-7 = ?$ $79-8 = ?$
   $57-9 = ?$ $91-7 = ?$
3. Count backwards from 99 by 7's; then by 8's.
4. Name the sums at sight:

9	7	5	9	7	15	13	5	7	5
8	6	8	3	9	7	4	6	9	9

5. $56371 \div 7 = ?$
6. $7209 \div 9 = ?$

c

1. Add \$99, \$40, \$62.
2. 8 pk. = —— qt.
3. Add:

9	7	5	8	5	9
3	8	6	9	4	8
4	9	7	8	7	7
5	7	1	7	9	9
6	6	9	6	3	8
7	5	7	5	4	1

4. $1\frac{1}{4}$ hr. = —— min.
5. $1\frac{1}{4}$ da. = —— hr.

d

1. How many pints of milk will be used in 30 days if a quart and a pint is used each day?
2. How many ounce packages can be made from 9 lb. of cabbage seed?
3. $5982 \div 6 = ?$
4. $302-189 = ?$
   $521-367 = ?$
5. $9 \times 309 = ?$ $7 \times 694 = ?$

FOURTH GRADE — FIRST HALF

READING AND WRITING NUMBERS

For convenience in reading large numbers, the figures are generally separated by commas into groups of three figures each, called **periods**.

The first period, counting from the right, is **units**; the second, **thousands**.

The following table shows the arrangement of these periods, and the three orders of figures in each period:

Thousands' Period			Units' Period		
Hundred-thousands	Ten-thousands	Thousands	Hundreds	Tens	Ones
6	4	1,	3	7	6

The number in the table is read, "641 thousand, 376."

Copy, point off, and read:

	a	*b*	*c*	*d*
1.	2000	20135	81125	125125
2.	20000	20648	48760	625840
3.	21000	56506	40084	760894
4.	36000	94600	61006	300404

WRITING NUMBERS

Express in figures:

1. Forty-two thousand.
2. Sixty-six thousand four.
3. Seventy-five thousand fifty.
4. Thirty-nine thousand one hundred twenty-two.
5. Two hundred ten thousand three hundred fifty.
6. Five hundred sixty-five thousand one hundred.
7. One hundred twenty-five thousand.
8. Six hundred thousand thirty-five.
9. Nine thousand twenty-six.

ROMAN NUMERALS

1. Write the Roman number for:

   20, 25, 32, 48, 16, 50, 57.

2. LX = 60. LXX = 70. LXXX = 80.

   Write the Roman numbers from 50 to 70.

3. C = 100. CC = 200. XC = 90. XCIX = 99.

   Write the Roman numbers from 70 to 100.

   Write 210, 290, 299, 300, 349, 235, 341.

   Read XCII, CIX, CCXL, CCXCIX.

ADDITION

1. Add 234, 359, and 266.

234 = 2 hundreds + 3 tens + 4 ones
359 = 3 hundreds + 5 tens + 9 ones
266 = 2 hundreds + 6 tens + 6 ones
859 = 7 hundreds + 14 tens + 19 ones.

19 ones = 1 ten and 9 ones. Write the 9 in ones' place and carry the 1 ten to tens' place. 14 tens + 1 ten = 15 tens. Write the 5 in tens' place and carry the 1 to hundreds' place. 7 hundreds + 1 hundred = 8 hundreds.

Write from dictation, then add and test:

	a	*b*	*c*	*d*	*e*	*f*
2.	234	230	101	231	301	243
	326	325	304	405	226	206
	434	265	376	568	304	306
3.	405	304	604	400	291	905
	304	349	787	697	743	634
	296	200	342	345	456	393
4.	623	344	23	509	20	502
	5	593	906	5	102	205
	340	25	25	820	67	50
5.	708	931	68	7	423	791
	55	67	834	751	92	8
	634	8	436	534	899	958

ADDITION

1. Find the sum of 2430, 4307, and 68.

2430 = 2 thousands + 4 hundreds + 3 tens + 0 ones
4307 = 4 thousands + 3 hundreds + 0 tens + 7 ones
68 = 0 thousands + 0 hundreds + 6 tens + 8 ones
6805 = 6 thousands + 7 hundreds + 9 tens + 15 ones.

15 ones = 1 ten + 5 ones. 1 ten + 9 tens = 10 tens or 1 hundred. 1 hundred + 7 hundreds = 8 hundreds. 4 thousands + 2 thousands = 6 thousands.

Write from dictation; then add:

	a	*b*	*c*	*d*	*e*
2.	23	378	298	1008	603
	604	49	342	49	2798
	3068	3067	6781	706	6987
3.	1304	2004	4987	3740	6425
	279	3050	9	609	4020
	6000	50	807	4203	205
	200	674	5002	6001	1347

4. Add the examples on pages 66 and 67.

Addition by Endings

Give sums from left to right:

5.	16 + 9	26 + 9	46 + 9	66 + 9	76 + 9
6.	17 + 5	37 + 5	47 + 5	67 + 5	87 + 5
7.	8 + 6	18 + 6	28 + 6	38 + 6	68 + 6
8.	18 + 5	38 + 5	98 + 5	78 + 5	68 + 5

ADDITION

Write from dictation; then add:

1. Twenty-five; two hundred twenty-five.
2. Four hundred two; seventy-three; nine.
3. Four thousand twenty; six hundred six; five.
4. Six hundred ninety; ten; two thousand four.
5. Two hundred eighty; nineteen; six; one thousand.
6. $230 + 65 + 100 + 405$.
7. $300 + 9 + 25 + 500$.
8. $65¢ + 10¢ + 100¢ + 1000¢$.
9. $\$42 + \$504 + \$105 + \$3$.
10. 24 pt. + 120 pt. + 7 pt. + 36 pt.
11. 1000 qt. + 14 qt. + 135 qt. + 10 qt.
12. 174 pk. + 130 pk. + 5 pk. + 800 pk.

Addition by Endings

Give sums from left to right.

	a	*b*	*c*	*d*	*e*	*f*	*g*
13.	19	39	49	69	89	99	59
	6	6	6	6	6	6	6
14.	28	78	58	38	68	48	98
	9	9	9	9	9	9	9
15.	7	37	67	27	87	97	77
	4	4	4	4	4	4	4

ADDITION BY GROUPS

3		4		3	
5	8	2	6	2	6
				1	
4		7		5	
6	10	3	10	4	10
				1	
2		4		8	
6	8	4	8	2	15
5		5		5	
4	9	3	8		
35		32		31	

1. Add quickly by grouping two or three numbers, as indicated, or in other groups in which the pupil can readily think the sum.

Check the addition by adding downward.

Add as above:

2.	*a*	*b*	*c*	*d*	*e*	*f*
	6	8	28	50	25	123
	3	2	34	37	48	481
	5	4	56	23	7	73
	4	6	67	52	36	29
	7	5	41	18	29	167
	3	3	29	26	54	423
	8	7	73	32	83	65
3.	65	42	76	81	34	49
	56	54	37	19	46	74
	34	12	69	56	94	29
	43	53	74	68	67	98
	14	55	33	74	52	72
	64	45	23	48	29	45
	50	34	14	33	43	94

ADDITION

Add from left to right and from right to left:

1. 8, 4, 6, 5, 8, 7, 4, 9, 3, 6, 4, 8, 6.
2. 24, 16, 13, 42, 19, 5, 9, 6, 7, 5, 4, 9.
3. 18, 23, 90, 64, 75, 6, 6, 9, 15, 19, 10.

Read and solve:

4. $2465 + 3642 + 4612 + 5534 + 6342 = ?$
5. $4756 + 3254 + 4321 + 4132 + 3536 = ?$
6. $4234 + 3512 + 2435 + 1543 + 2453 = ?$
7. $5243 + 2453 + 3215 + 4123 + 4231 = ?$
8. $6314 + 1355 + 2652 + 1623 + 3245 = ?$

9. A carpenter had 23 men and hired 13 more. How many had he then?

10. Mr. Jones deposited $123 in a bank on Monday; $232 on Tuesday; and $321 on Wednesday. How much did he deposit in the three days?

11. A ship sailed 223 miles the first day, 320 miles the second day, and 231 miles the third day. How many miles did it sail?

12. A farmer raised 230 bushels of wheat, 122 bushels of corn, 112 bushels of oats, and 323 bushels of rye. How many bushels of grain did he raise?

13. Mrs. Foster bought a bedroom set of furniture for $125, a piano for $350, curtains for $52, pictures for $128, and a rug for $23. How much did they all cost?

DRILL IN ADDITION

Add rapidly and check, finding 3 answers in 1 minute.

	a	*b*	*c*	*d*	*e*
1.	2345	3256	3556	4325	2546
	3253	5433	5234	2534	3452
	1432	2345	3245	3523	2543
	2564	4356	5243	2456	3245
	7316	5134	2356	5346	1236
2.	2434	3245	2546	6513	5342
	3256	1452	4532	3245	4254
	5145	5416	3251	5314	6143
	4253	2533	5424	2425	3325
	3242	3254	1243	5253	2543
3.	6325	6436	6323	6546	6546
	4264	2462	2566	3562	4362
	2633	6354	6344	6255	6543
	1462	5633	2565	5364	2544
	6326	3265	6355	4534	6355

4. Give sums at sight, thus: $32 + 40 = 72$; $72 + 5 = 77$.

32 + 45	55 + 34	54 + 32	26 + 34	43 + 44
64 + 36	56 + 56	23 + 34	42 + 64	25 + 56
56 + 45	64 + 46	42 + 32	36 + 25	66 + 36
64 + 35	36 + 25	26 + 43	53 + 36	54 + 26
38 + 17	37 + 26	59 + 17	35 + 45	25 + 28
29 + 16	25 + 47	57 + 24	66 + 26	38 + 26
19 + 28	49 + 26	39 + 58	47 + 47	29 + 25

SUBTRACTION

1. From 803 subtract 576.

7 9 13
8 0 3 = 7 hundreds + 9 tens + 13 ones
5 7 6 = 5 hundreds + 7 tens + 6 ones
2 2 7 = 2 hundreds + 2 tens + 7 ones.

Take 1 hundred from 8 hundreds; this leaves 7 hundreds. 1 hundred equals 10 tens. Take 1 ten from 10 tens; this leaves 9 tens. 1 ten and 3 ones are 13 ones. 803 then is equal to 7 hundreds, 9 tens, and 13 ones. 13 ones − 6 ones = 7 ones; 9 tens − 7 tens = 2 tens; 7 hundreds − 5 hundreds = 2 hundreds. *Answer*, 227.

Subtract and test:

	a	*b*	*c*	*d*	*e*	*f*
2.	604	809	701	902	606	705
	160	341	202	720	408	496
3.	2042	4106	5001	8012	4400	1407
	1012	2014	3014	5707	3870	1289

Read; then subtract and test:

	a	*b*	*c*	*d*	*e*
4.	8404	7604	5041	5202	7011
	3625	4896	1979	1824	4583
5.	7024	8401	5401	8704	4087
	3767	4574	2519	6247	1069

6. Subtract 187 from 9234; then take 187 from each successive remainder, until the final remainder is 7364.

SUBTRACTION

1 From 700 take 264.

$$\begin{array}{l} {\scriptstyle 6\,9\;10} \\ 700 = 6 \text{ hundreds} + 9 \text{ tens} + 10 \text{ ones} \\ 264 = 2 \text{ hundreds} + 6 \text{ tens} + 4 \text{ ones} \\ \hline 436 = 4 \text{ hundreds} + 3 \text{ tens} + 6 \text{ ones} \end{array}$$

Subtract and test:

	a	*b*	*c*	*d*	*e*	*f*
2.	500	600	900	400	800	700
	154	247	678	197	372	309
3.	300	700	600	800	200	400
	263	288	327	561	181	397
4.	300	800	842	100	600	500
	194	245	700	91	448	238

5. Make, solve, and test 20 problems like the above.

Subtract and test:

	a	*b*	*c*	*d*	*e*	*f*
6.	769	819	346	665	749	864
	374	568	94	374	298	539
7.	332	748	552	175	729	534
	140	339	429	68	549	360

Subtraction by Endings

Give at sight:

8.	18 − 9	28 − 9	38 − 9	48 − 9	68 − 9	98 − 9
9.	17 − 9	27 − 9	37 − 9	47 − 9	77 − 9	87 − 9

SUBTRACTION AND ADDITION

Subtract and test:

	a	*b*	*c*	*d*	*e*
1.	6432	7244	6475	7994	8641
	4176	5371	3879	3877	1282
2.	4531	4351	4234	2432	2134
	1522	1543	1235	1344	1545
3.	5423	4215	3254	3524	8231
	2545	1567	1565	1566	4743
4.	4253	3231	5453	8121	6414
	1464	1865	1974	3642	3892
5.	6304	7065	6401	8014	4706
	3168	1474	3162	6202	2165
6.	4060	8305	8560	6070	4904
	2976	6012	3574	4304	1060
7.	6105	7805	6099	3940	6303
	2166	4991	4814	2108	1494
8.	8110	4444	6222	8314	8196
	4884	2666	4879	6070	7246

9–28. Write the four numbers under 1 and 2 *a*, and add them. Do the same with 1 and 2 *b*, *c*, *d*, and *e*; then with 3 and 4 *a*, *b*, *c*, *d*, and *e*; then with 5 and 6 *a*, *b*, *c*, *d*, and *e*; and then with 7 and 8 *a*, *b*, *c*, *d*, and *e*.

DRILLS IN SUBTRACTION AND ADDITION

Subtract rapidly, and test results:

	a	*b*	*c*	*d*	*e*
1.	5434	3254	4203	6043	2015
	3565	2435	1564	2564	1356
2.	4360	3204	3204	2010	3014
	2654	1605	1315	1516	2546
3.	3105	4010	6302	3051	6031
	1046	2505	2603	2103	5076
4.	6035	6501	1045	3060	4320
	2456	2436	556	2065	1556
5.	1405	2601	3561	6306	5041
	656	1654	1456	2501	1305
6.	6702	2041	6020	5031	6043
	3026	1554	1615	1025	1245

Note how many remainders you can find in one minute. Keep a score card for several days and try to beat your own record.

7–21. Write the four numbers under 1 and 2 *a*, and add them. Do the same with 1 and 2 *b*, *c*, *d*, and *e*; then with 3 and 4 *a*, *b*, *c*, *d*, and *e*; then with 5 and 6 *a*, *b*, *c*, *d*, and *e*.

SUBTRACTION

1. From 5000 take 3456.

4 9 9 10	6 from 10 leaves 4
5 0 0 0	5 from 9 leaves 4
3 4 5 6	4 from 9 leaves 5
1 5 4 4	3 from 4 leaves 1

	a	*b*	*c*	*d*	*e*
2.	6734	8090	7004	6000	9000
	4578	5694	5896	4187	3999
	2156	2396	1108	1813	5001

Subtract:

	a	*b*	*c*	*d*	*e*
3.	9084	7604	5003	8460	6080
	6097	4909	3806	7469	5908
4.	9600	7039	6800	7001	4403
	3097	6799	5009	1903	3040
5.	5004	8040	7409	6400	7003
	3904	4409	3790	4986	6800
6.	8703	6009	8001	5904	9873
	5008	4939	6809	3400	4980
7.	7003	5900	9204	7405	5900
	4906	3098	8909	6097	4397

ADDITION AND SUBTRACTION

1. In the Central School, there are 398 pupils; in the Garfield School, 1045, and in the Holmes School, 2306. How many pupils are there in the three schools?

2. Mr. Adams's home cost $4370, and Mr. Boyd's cost $3745. Find the difference in the cost of their homes.

3. John lives 5906 feet from his school, and Thomas lives 2194 feet nearer the school than John. How far does Thomas live from the school?

4. Bertha counted the people in four parades. In the first there were 208; in the second, 890; in the third, 1506; and in the fourth, 1781. How many were there in all?

5. In two city schools, boys parade as soldiers. In the first school there are 1790 boys; in the second school 279 boys less than in the first. How many boys are there in the second school?

6. A merchant sold for the fourth of July, 3706 small flags, 1712 larger flags, and 19 flags for flag poles. How many flags did he sell?

7. In counting the steps to school, Joseph took 1370, and Harvey took 940 less than Joseph. How many steps did Harvey take?

8. A street-car conductor collected 103 fares on the first trip, 72 on the second trip, 176 on the third trip, and 39 on the fourth trip. How many fares did he collect?

UNITED STATES MONEY

1. Count by 4's from 2 to 100; from 3 to 99.
2. Count by 6's from 3 to 99; from 5 to 101.
3. Count by 8's from 3 to 99; from 4 to 100.

Add the following, allowing five minutes for each:

	a	*b*	*c*	*d*
4.	$32.45 +	$50.75 +	$32.11 +	$321.65 =
5.	61.79 +	1.24 +	2.84 +	94.76 =
6.	8.15 +	6.19 +	16.31 +	8.92 =
7.	23.42 +	83.72 +	5.49 +	143.74 =
8.	94.76 +	9.85 +	26.32 +	25.81 =

9.	$35.18 +	$85.24 +	$21.89 +	$ 86.42 =
	92.76 +	8.93 +	39.65 +	93.84 =
	9.84 +	16.82 +	84.21 +	2.69 =
	26.37 +	73.25 +	16.93 +	39.87 =
	$ +	$ +	$ +	$ =

Subtract, allowing one half minute for each:

	a	*b*	*c*	*d*
10.	$275.43	$536.75	$408.37	$674.26
	167.35	308.28	276.58	210.75
11.	$682.72	$826.45	$527.05	$763.72
	79.80	60.76	89.98	140.80

UNITED STATES MONEY

Read and add:

	a	*b*	*c*	*d*
1.	$246.25	$632.75	$327.56	$805.96
	318.75	738.49	928.89	613.73
	92.48	918.86	738.86	928.45
	18.64	29.94	198.37	56.91
	237.75	169.83	75.59	219.87
2.	$178.84	$219.35	$165.27	$214.56
	6.92	7.29	86.15	3.94
	175.49	216.87	283.85	69.47
	862.81	938.75	395.94	138.85
	219.97	139.49	415.86	475.27

3. $465.75 + $37.28 + $692.37 + $475.84 = ?
4. $193.85 + $87.96 + $375.84 + $215.79 = ?
5. $276.49 + $29.49 + $ 49.86 + $936.93 = ?
6. $475.98 + $18.07 + $126.92 + $214.85 = ?

Subtract and test:

	a	*b*	*c*	*d*
7.	$475.36	$435.24	$438.64	$821.42
	196.28	178.95	195.73	195.38
8.	$317.61	$124.15	$326.47	$412.49
	219.84	95.76	158.96	273.89

9. $246.37 − $174.75

10. $235.55 − $169.73

UNITED STATES MONEY

(Notice the groups that make 10 or 15.)

Add:

	a	*b*	*c*	*d*	*e*
1.	$ 15.73	$ 30.86 } 15	$ 6.93	$ .48	$ .17
	6.98	15.29 }	32.63	2.75	.28
	.37 } 15	8.88	4.30	.76	5.70
	5.18 }	.68 } 15	12.51	5.85	16.37
	40.60	7.27 }	8.78	40.20	4.70
	5.89 } 10	23.85 } 10	.36	6.58	23.96
	.31 }	.25 }	.50	18.64	.85

2. Mr. Foster sold in 5 days as follows. Find each day's sales, total sales, and receipts for each article.

	Mon.	Tues.	Wed.	Thurs.	Fri.
	a	*b*	*c*	*d*	*e*
Corn	$75.25	$68.75	$27.35	$87.45	$64.65
Oats	18.42	26.73	16.72	29.63	37.26
Bran	6.75	3.75	8.25	7.75	9.45
Chop	12.34	8.65	17.38	15.24	16.28
Meal	3.60	5.40	7.60	12.60	17.20
Flour	47.25	68.25	78.75	89.25	110.25

3. A man made 7 deposits as follows: $ 145.75, $ 123.34, $ 134.89, $ 645.75, $ 800.05, $ 900.25, $ 845.52. How much money did he deposit?

4. My expenses for 6 days were respectively, $ 1.42, $ 2.05, $ 2.36, $ 2.12, $ 1.45, and $ 2.15. What were my expenses for the week?

MAKING CHANGE

Secure toy money, or make circles from cardboard to represent the different pieces.

Appoint storekeepers and purchasers, and have the counting done in the schoolroom. Consult "Market Report" for prices.

1. Hattie's purchase.

Sugar,	10¢
Butter,	15¢
Potatoes,	12¢
Cost,	37¢
Change	1¢
	1¢
	1¢
	10¢
	50¢

The storekeeper, when making the change, places the coins as he counts, thus: 38¢, 39¢, 40¢, 50¢. Change, 13¢.

2. John's purchase.

Fire crackers,	15¢
Torpedoes,	5¢
Matches,	2¢
Rockets,	20¢
Cost,	42¢
Change	1¢
	1¢
	1¢
	5¢
	50¢

3. Willie bought meat for 30¢ and milk for 4¢. How much change should he receive from 50¢?

Make change from 50¢ for:

4. Oranges for 15¢, lemons for 8¢, pears for 5¢.
5. Popcorn for 6¢, taffy for 10¢, nuts for 25¢.
6. Rice for 8¢, tapioca for 15¢, prunes for 10¢.
7. Potatoes for 15¢, bread for 8¢, turnips for 12¢.
8. Plums for 20¢, sugar for 10¢, pepper for 8¢.
9. Celery for 7¢, lettuce for 9¢, spinach for 12¢.
10. Corn for 12¢, seed for 25¢, apples for 10¢.

MAKING CHANGE

Groceries

Make change from 25¢ for:

1. 2 lb. of rice at 8¢ a pound.
2. 1 cake of soap for 6¢.
3. ½ lb. of butter at 34¢ a pound.
4. 2 boxes of stove polish at 10¢ each.
5. ¼ lb. of ginger at 40¢ a pound.

Dry Goods

Make change from 50¢ for:

6. 3 collars at 10¢ each.
7. 4 yd. of lace at 8¢ a yard.
8. 3 doz. buttons at 15¢ a dozen.
9. 1½ yd. of elastic at 8¢ a yard.
10. 1 apron at 39¢.

Meat and Vegetables

Make change from a dollar for:

11. 2 lb. of steak at 27¢ a pound.
12. 1 small ham for 87¢.
13. 2 pk. of potatoes at 30¢ a peck.
14. 3 lb. of beef at 15¢ a pound.
15. Change the number on the cash register and make change from one dollar; fifty cents; a quarter.

PRACTICAL PROBLEMS

1. A huckster's sales for the week were as follows: \$3.25, \$7.15, \$2.45, \$6.45, and \$8.79. What was the amount of his sales?

2. A boy's suit that was marked \$6.98 was sold for \$1.25 less. What was the selling price of the suit?

3. James had \$5.94; he spent \$2.85. How much had he left?

4. What is the difference in the price of two hats marked \$4.50 and \$3.60?

5. The following amounts were deposited in the school savings bank: \$2.15, \$1.65, \$7.09, \$3.68, and \$9.15. What was the total of these deposits?

6. Mrs. Jones paid \$2.75 for a turkey, \$.30 for cranberries, \$.15 for butter, and \$.48 for coffee. What was the whole cost?

7. How many school badges 4 in. long can be made from 2 yd. of ribbon?

8. A clock that strikes the hours strikes how many strokes between one o'clock and six inclusive?

9. How many square inches are there in an 8-inch square?

10. There are 639 oranges in 9 baskets, with the same number in each. How many are there in each basket?

11. If you receive \$2.75, \$6.96, and \$8.15 and want to change it into five-dollar bills, how many should you get and how much money over?

PRACTICAL PROBLEMS

1. A man paid $2.50 for a hat and $15.50 for a suit. How much did he pay for both?

$ 2.50, cost of hat.
15.50, cost of suit.
$ 18.00, cost of both.

2. A merchant sold 425 bu. of potatoes, 232 bu. of apples, and 189 bu. of onions. Find the total number of bushels sold.

3. A lady paid $25 for a carpet, $71 for a rug, and $7 for curtains. What was the amount of her bill?

4. How many days are there from July 1 to Dec. 31?

5. A man left his estate to his wife, son, and daughter. His wife received $ 9845, his son $ 3650, and his daughter $ 3500. What was the value of the whole estate? *

6. I sold my house for $ 5675, thereby losing $ 897. How much did the house cost?

7. A lawn is 30 ft. long and 24 ft. wide. How many feet is it around the lawn?

8. The distance from New York to Philadelphia by rail is 92 miles and the distance from Philadelphia to Atlantic City is 60 miles. How far is it from New York to Atlantic City?

* Before solving, estimate the answer mentally thus: $ 10,000 + $ 3500 + $ 3500 = $ 17,000. Then find the exact answer, and compare the results. How much do they differ?

PRACTICAL PROBLEMS

1. A ranchman bought 468 cows and sold 239 of them. How many had he left?

468, number of cows bought.
239, number of cows sold.
229, number of cows remaining.

2. Mr. Jones was born in 1851. How many years old is he if now living?

3. A man's property sells for $47,892. He owes $36,987. How much has he left after paying his debts?*

4. In a certain election A received 38714 votes and B 29867 votes. How much did A's vote exceed B's?

5. I sold a farm for $5628, which was at a gain of $1394. What was the cost of the farm?

6. A merchant bought 26520 bu. of grain and sold 18296 bu. How many bushels had he left?

7. The population of a town is 8596. Ten years ago it was 2397. What was the increase in ten years?*

8. A man's salary is $2525 a year. His expenses are $1786. How much can he save in a year?

9. A barrel of flour weighs 200 lb. The barrel itself weighs 4 lb. How many pounds of flour are there in a barrel?

10. At an election the whole number of ballots cast was 11342. Of this number A received 8673. How many votes were cast for his opponent?*

* Estimate the answer by calculating in even thousands.

MULTIPLYING BY 10

1. Count by 10's to 100. Build the table of 10's.

2. How many are 9×10? $90 + ? = 100$.

3. Place a naught to the right of 4. What number have you? 40 is how many times 4? Place a naught to the right of 6; 3; 7; 9; 11; 12. See whether each product has become ten times the number.

Annexing a naught to the right of a number multiplies it by 10.

4. Annex 0 to each number. Notice the effect:

4	20	36	75	42	87	275
93	87	692	387	509	938	765

Table of 10's

$10 \times 1 = 10$	$10 \times 7 = 70$
$10 \times 2 = 20$	$10 \times 8 = 80$
$10 \times 3 = 30$	$10 \times 9 = 90$
$10 \times 4 = 40$	$10 \times 10 = 100$
$10 \times 5 = 50$	$10 \times 11 = 110$
$10 \times 6 = 60$	$10 \times 12 = 120$

5. Memorize this table.

6. Compare:

10×5 with 5×10

8×10 with 10×8

11×10 with 10×11

40 and 80 100 and 10

120 and 12 110 and 11

Find the cost of:

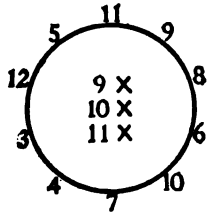
7. 10 newspapers @ 5¢.
8. 5 ladies' hats @ \$10.
9. 10 oranges @ 2 for 5¢.
10. $10\frac{1}{2}$ yd. muslin @ 12¢.
11. $9\frac{1}{2}$ lb. lard @ 10¢.
12. $12\frac{1}{2}$ doz. buttons @ 10¢.
13. 10 qt. milk @ 8¢.
14. $10\frac{1}{4}$ bu. tomatoes @ 80¢.

MULTIPLYING BY 11

1. Count by 11's to 33; to 66; to 99. Build the table of 11's.

2. $9 \times 11 = ?$ $99 + 11 = ?$ How many 11's = 110?

3. $10 \times 11 = ?$ 10 times 11, plus $11 = ?$ How many are 11×11?



4. To find 12×11 how many must be added to 11×11? $12 \times 11 = ?$

5. Give at sight:

10×11	12×11	5×11
3×11	4×11	8×11
6×11	11×9	11×7

Table of 11's

$11 \times 1 = 11$	$11 \times 7 = 77$
$11 \times 2 = 22$	$11 \times 8 = 88$
$11 \times 3 = 33$	$11 \times 9 = 99$
$11 \times 4 = 44$	$11 \times 10 = 110$
$11 \times 5 = 55$	$11 \times 11 = 121$
$11 \times 6 = 66$	$11 \times 12 = 132$

6. Memorize this table.

7. Compare:

11×7 with 7×11
9×11 with 11×9
11×4 with 4×11
12×11 with 11×12
6×11 with 11×6

8. Find the products:

11×60	11×80	11×40	11×100	11×35
11×90	11×50	11×20	11×45	11×25
11×13	11×30	11×70	11×15	11×18

Find:

9. $\frac{1}{11}$ of 132; of 88; of 121; of 110; of 99; of 77.

REMAINDER IN DIVISION

1. Divide 345 by 2.

2)345 3 hundred ÷ 2 = 1 hundred and
$172\frac{1}{2}$ Quotient 1 hundred (10 tens) remaining.
14 tens ÷ 2 = 7 tens. 5 units ÷ 2 = 2 units and 1 unit remaining. This one unit is called the **remainder**. There are no 2's in one unit so the 1 unit is written over the divisor thus, $\frac{1}{2}$, and is placed beside the other figures in the quotient. The answer is read one hundred seventy-two and one half.

Divide:

	a	*b*	*c*	*d*
2.	789 by 2	284 by 3	793 by 2	3940 by 7
3.	465 by 4	500 by 7	875 by 6	1945 by 4
4.	297 by 5	278 by 5	700 by 3	2378 by 3

5. Divide 461 by 2.

2)461 **Test.** If the answer is correct, then
$230\frac{1}{2}$ 2×230 or 460, + 1, the remainder, will equal 461, the dividend.

Divide by 2 and test; by 3:

	a	*b*	*c*	*d*	*e*
6.	265	864	786	624	7368
7.	713	219	265	578	2457

Divide by 4 and test:

8.	268	936	6981	3874	4876
9.	864	468	5034	2190	3841

MULTIPLYING BY 12

1. Count by 12's to 36; to 72; to 144. How many are 12 times 12? Build the table of 12's.

Table of 12's

$12 \times 1 = 12$	$12 \times 7 = 84$
$12 \times 2 = 24$	$12 \times 8 = 96$
$12 \times 3 = 36$	$12 \times 9 = 108$
$12 \times 4 = 48$	$12 \times 10 = 120$
$12 \times 5 = 60$	$12 \times 11 = 132$
$12 \times 6 = 72$	$12 \times 12 = 144$

2. Memorize this table.

3. Multiply by 12; by 11:

465	236	789
546	783	928
784	937	693
785	514	938
978	694	296

1 dozen = 12 1 gross = 144

4. What two numbers make the following products?

25	27	28	30	32	35	36	40	42	45	48
49	56	60	63	64	66	72	80	84	88	96

Multiply by 12:

	a	*b*	*c*	*d*	*e*	*f*
5.	152	264	371	468	156	137
6.	177	132	78	96	235	339
7.	384	780	529	795	579	706
8.	291	231	604	405	234	589

9. How many eggs are there in 612 boxes, each containing one dozen?

10. Find the weight of 12 barrels of flour, each weighing 196 pounds.

DIVIDING BY 10

1. Beginning with 0 count by 10's to 100. Beginning with 1 count by 10's to 101.

2. 50 is how many times 5? How does 60 compare with 6? Remove the naught from 80. What is the result? 8 is what part of 80?

3. Remove the naught from 30; from 90; from 70. How does each result compare with the number?

4. 3 is what part of 30? $\frac{1}{10}$ of 30 = ? 4 is what part of 40? $\frac{1}{10}$ of 40 = ?

Removing a naught from the right of any number divides it by 10.

5. Divide by 10. Complete in two minutes.

40	30	90	80	60	100	120
320	560	980	750	360	470	920
1450	1680	2450	1930	2210	9990	7400
6320	4040	3100	2010	8500	7280	6900

6. How many 10-minute lesson periods are there in an hour?

7. At 10 cents a quart, how many quarts of milk can be bought with 90 cents?

8. How long will it take a motor car, going 10 miles an hour, to travel 140 miles?

9. If I pay 50¢ for a telegram of 10 words, how much do I pay for each word?

DIVIDING BY 11 AND 12

1. Subtract by 11's from 132 to 0.

2. State quotients at sight:

33 ÷ 11	66 ÷ 11	88 ÷ 11	132 ÷ 11
44 ÷ 11	77 ÷ 11	99 ÷ 11	121 ÷ 11

3. Find $\frac{1}{11}$ of: 88; 99; 22; 78; 33; 48; 44; 55; 69; 11; 66; 81; 77; 92; 88; 99; 110; 121; 83.

Divide by 11: Test answers.

4. 2738	7. 6954	10. 8923	13. 69753
5. 8294	8. 3986	11. 2158	14. 73065
6. 2036	9. 3007	12. 8057	15. 90074

16. Subtract by 12's from 144 to 0.

17. State quotients at sight:

36 ÷ 12	60 ÷ 12	84 ÷ 12	132 ÷ 12
24 ÷ 12	96 ÷ 12	108 ÷ 12	144 ÷ 12

18. Find $\frac{1}{12}$ of: 96; 84; 72; 36; 108; 24; 120; 132; 60; 48; 144.

Divide by 12: Test answers.

19. 3678	24. 7817	29. 42192	34. 91875
20. 4135	25. 2936	30. 69378	35. 24726
21. 6973	26. 9238	31. 73945	36. 68359
22. 7128	27. 4697	32. 82659	37. 81763
23. 4693	28. 9384	33. 37296	38. 92364

MULTIPLICATION TABLE

1 × 1 = 1	2 × 1 = 2	3 × 1 = 3	4 × 1 = 4
1 × 2 = 2	2 × 2 = 4	3 × 2 = 6	4 × 2 = 8
1 × 3 = 3	2 × 3 = 6	3 × 3 = 9	4 × 3 = 12
1 × 4 = 4	2 × 4 = 8	3 × 4 = 12	4 × 4 = 16
1 × 5 = 5	2 × 5 = 10	3 × 5 = 15	4 × 5 = 20
1 × 6 = 6	2 × 6 = 12	3 × 6 = 18	4 × 6 = 24
1 × 7 = 7	2 × 7 = 14	3 × 7 = 21	4 × 7 = 28
1 × 8 = 8	2 × 8 = 16	3 × 8 = 24	4 × 8 = 32
1 × 9 = 9	2 × 9 = 18	3 × 9 = 27	4 × 9 = 36
1 × 10 = 10	2 × 10 = 20	3 × 10 = 30	4 × 10 = 40
1 × 11 = 11	2 × 11 = 22	3 × 11 = 33	4 × 11 = 44
1 × 12 = 12	2 × 12 = 24	3 × 12 = 36	4 × 12 = 48
5 × 1 = 5	6 × 1 = 6	7 × 1 = 7	8 × 1 = 8
5 × 2 = 10	6 × 2 = 12	7 × 2 = 14	8 × 2 = 16
5 × 3 = 15	6 × 3 = 18	7 × 3 = 21	8 × 3 = 24
5 × 4 = 20	6 × 4 = 24	7 × 4 = 28	8 × 4 = 32
5 × 5 = 25	6 × 5 = 30	7 × 5 = 35	8 × 5 = 40
5 × 6 = 30	6 × 6 = 36	7 × 6 = 42	8 × 6 = 48
5 × 7 = 35	6 × 7 = 42	7 × 7 = 49	8 × 7 = 56
5 × 8 = 40	6 × 8 = 48	7 × 8 = 56	8 × 8 = 64
5 × 9 = 45	6 × 9 = 54	7 × 9 = 63	8 × 9 = 72
5 × 10 = 50	6 × 10 = 60	7 × 10 = 70	8 × 10 = 80
5 × 11 = 55	6 × 11 = 66	7 × 11 = 77	8 × 11 = 88
5 × 12 = 60	6 × 12 = 72	7 × 12 = 84	8 × 12 = 96
9 × 1 = 9	10 × 1 = 10	11 × 1 = 11	12 × 1 = 12
9 × 2 = 18	10 × 2 = 20	11 × 2 = 22	12 × 2 = 24
9 × 3 = 27	10 × 3 = 30	11 × 3 = 33	12 × 3 = 36
9 × 4 = 36	10 × 4 = 40	11 × 4 = 44	12 × 4 = 48
9 × 5 = 45	10 × 5 = 50	11 × 5 = 55	12 × 5 = 60
9 × 6 = 54	10 × 6 = 60	11 × 6 = 66	12 × 6 = 72
9 × 7 = 63	10 × 7 = 70	11 × 7 = 77	12 × 7 = 84
9 × 8 = 72	10 × 8 = 80	11 × 8 = 88	12 × 8 = 96
9 × 9 = 81	10 × 9 = 90	11 × 9 = 99	12 × 9 = 108
9 × 10 = 90	10 × 10 = 100	11 × 10 = 110	12 × 10 = 120
9 × 11 = 99	10 × 11 = 110	11 × 11 = 121	12 × 11 = 132
9 × 12 = 108	10 × 12 = 120	11 × 12 = 132	12 × 12 = 144

SIGHT DRILL

Give correct answers:

	a	*b*	*c*	*d*
1.	24 ÷ 3	96 ÷ 12	44 ÷ 11	35 ÷ 7
2.	88 ÷ 11	60 ÷ 5	32 ÷ 8	33 ÷ 11
3.	22 ÷ 11	90 ÷ 10	72 ÷ 6	25 ÷ 5
4.	49 ÷ 7	81 ÷ 9	18 ÷ 2	66 ÷ 11
5.	24 ÷ 6	16 ÷ 2	24 ÷ 4	63 ÷ 7
6.	66 ÷ 6	27 ÷ 9	50 ÷ 10	48 ÷ 12
7.	70 ÷ 10	36 ÷ 4	20 ÷ 4	60 ÷ 12
8.	56 ÷ 7	96 ÷ 8	20 ÷ 2	20 ÷ 10
9.	72 ÷ 9	40 ÷ 5	56 ÷ 8	28 ÷ 7
10.	77 ÷ 7	36 ÷ 6	42 ÷ 7	30 ÷ 10
11.	24 ÷ 8	27 ÷ 3	24 ÷ 2	18 ÷ 9
12.	21 ÷ 3	50 ÷ 5	40 ÷ 8	99 ÷ 9
13.	54 ÷ 6	30 ÷ 6	108 ÷ 9	45 ÷ 9
14.	48 ÷ 6	35 ÷ 5	70 ÷ 7	80 ÷ 10
15.	36 ÷ 9	77 ÷ 11	63 ÷ 9	84 ÷ 12
16.	54 ÷ 9	12 ÷ 3	33 ÷ 3	32 ÷ 4
17.	64 ÷ 8	55 ÷ 5	72 ÷ 8	24 ÷ 12
18.	60 ÷ 6	84 ÷ 7	22 ÷ 11	99 ÷ 11
19.	144 ÷ 12	121 ÷ 11	110 ÷ 10	132 ÷ 11
20.	110 ÷ 11	132 ÷ 12	120 ÷ 12	120 ÷ 10

MULTIPLIERS ENDING IN NAUGHT

1. Annex a naught to the right of 3; then multiply 3 by 10. Is there any difference in the result?

Annexing a naught to the right of a number multiples it by 10.

2. Multiply by 10: 40; 20; 60; 800; 300; 700.

3. Multiply 3 by 100; 8 by 100; 9 by 100; 20 by 100. How many times greater has each of the numbers become? How many naughts were added to each?

Annexing two naughts to the right of a number multiplies it by 100.

4. Find:

100×4	100×15	100×50	100×75
100×5	100×37	100×91	100×36

5. What is the difference between 100×3 and 3×100? between 100×6 and 6×100? How many naughts were annexed to 3? to 6? How many times greater has each become?

Annexing three naughts to the right of a number multiplies it by 1000.

6. From what you have learned, make a rule for multiplying any number by 10; by 100; by 1000.

7. Multiply:

8 by 1000; 7 by 1000; 9 by 1000; 4 by 1000; 25 by 100; 36 by 10; 95 by 100; 72 by 10; 72 by 1000.

MULTIPLIERS ENDING IN NAUGHT

1. How many cents are there in 100 dimes?

2. How many cents are there in $6?

Find the weight of:

3. 100 two-pound packages of rolled oats.

4. 100 five-pound boxes of starch.

5. 25 one-hundred-pound kegs of nails.

6. 100 lambs at an average of 45 lb. each.

7. Find the cost of 100 one-cent postal cards and 100 two-cent stamps.

8. Multiply 63 by 200.

63
200
12600

Write the 2 of the multiplier under the figure in ones' place of the multiplicand. 2×63 is 126. Annex two naughts to the right of 126, making 12600. $100 \times 63 = 6300$; $200 \times 63 = 12600$.

Multiply, and read the product:

9. 71	10. 85	11. 245	12. 715
200	300	400	700

13. 347 by 20	18. 293 by 500	23. 481 by 200
14. 409 by 30	19. 786 by 700	24. 894 by 400
15. 715 by 60	20. 184 by 400	25. 906 by 700
16. 329 by 80	21. 796 by 600	26. 728 by 900
17. 475 by 90	22. 832 by 200	27. 365 by 120

DIVISORS ENDING IN NAUGHT

1. Divide 60 by 10. Remove 0 from 60. 60 is how many times 6?

2. Compare 40 and 4; 30 and 3; 2×10 and $20 \div 10$. What effect has the removing of naught from the right of a number upon the value of the number?

3. Divide by 10: 20; 900; 350; 470; 530; 260; 740.

4. How many are 100×6? 100×9? $600 \div 100 = ?$ $900 \div 100 = ?$ How many naughts are removed from the right of 900 when it is divided by 100? from the right of 600? What effect has the removing of two naughts from the right of a number upon the value of the number?

5. Find 1000×9; 1000×3; $9000 \div 1000$; $3000 \div 1000$. How many naughts are removed from the right of 9000 when it is divided by 1000? from the right of 3000? What effect has the removing of three naughts from the right of a number upon the number?

Removing one naught from the right of a number divides the number by 10; *removing two naughts, divides it by* 100; *removing three naughts, divides it by* 1000, *etc.*

Find quotients:

6.	$30 \div 10$	10.	$300 \div 100$	14.	$4000 \div 100$
7.	$90 \div 10$	11.	$600 \div 100$	15.	$5000 \div 1000$
8.	$70 \div 10$	12.	$700 \div 100$	16.	$9000 \div 1000$
9.	$200 \div 10$	13.	$900 \div 100$	17.	$7000 \div 1000$

DIVISION

1. Divide 1460 by 20.

$$\begin{array}{r} 2\cancel{0})\overline{146\cancel{0}} \\ 73 \end{array} \qquad \begin{array}{r} 2\cancel{00})\overline{146\cancel{00}} \\ 73 \end{array}$$

Cutting off naught, or the same number of naughts, from *both dividend and divisor* does not change the quotient.

Find the quotients:

2. $80 \div 20$	6. $900 \div 100$	10. $12000 \div 1000$
3. $60 \div 30$	7. $1000 \div 100$	11. $12000 \div 2000$
4. $90 \div 10$	8. $6000 \div 200$	12. $18000 \div 3000$
5. $40 \div 20$	9. $8400 \div 400$	13. $16000 \div 4000$

14. How many 10-gallon cans will a dealer use in shipping 200 gallons of milk?

15. How many 20-lb. packages can be made from 1000 lb. of coffee?

16. 2000 pounds of crackers were shipped in 400 boxes. How many pounds did each box contain?

17. How many \$20 coats must be sold to realize \$2400?

18. A man bought a house for \$3500. How many months will it take to pay for it at \$100 a month?

Give quotients at sight:

19. $160 \div 40$	23. $200 \div 50$	27. $750 \div 15$
20. $360 \div 30$	24. $480 \div 80$	28. $300 \div 60$
21. $900 \div 90$	25. $480 \div 60$	29. $250 \div 25$
22. $750 \div 30$	26. $220 \div 110$	30. $600 \div 50$

DRILL EXERCISES

Divide, practicing until the quotients for 9 problems can be found in 2 minutes:

1. 2873 by 7	4. 8196 by 8	7. 2403 by 9
2. 9865 by 8	5. 7963 by 9	8. 8173 by 8
3. 4793 by 9	6. 8910 by 7	9. 6294 by 9
10. 7386 by 8	13. 8197 by 8	16. 4003 by 8
11. 8794 by 9	14. 6934 by 9	17. 6920 by 7
12. 9387 by 9	15. 7879 by 7	18. 3784 by 9
19. 9234 by 7	22. 6010 by 9	25. 3215 by 7
20. 6875 by 8	23. 5362 by 7	26. 8629 by 9
21. 4132 by 9	24. 8104 by 8	27. 9273 by 8

Subtract rapidly:

28. 4284 – 2141	31. 8001 – 6448	34. 8004 – 2234
29. 8401 – 1762	32. 6001 – 4999	35. 7982 – 5460
30. 8109 – 4777	33. 9845 – 3677	36. 5698 – 3472
37. 6024 – 5107	40. 9045 – 4254	43. 3498 – 2004
38. 8460 – 6418	41. 8700 – 4286	44. 6699 – 3342
39. 7200 – 4540	42. 8760 – 4197	45. 7583 – 5620
46. 8794 – 4587	49. 6001 – 2478	52. 5590 – 1056
47. 8476 – 7421	50. 6424 – 3150	53. 9930 – 7810
48. 8921 – 5879	51. 4030 – 3289	54. 9706 – 5897

DRILL EXERCISES

Multiply 6 examples in one minute:

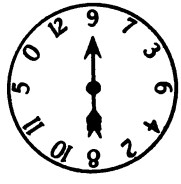
By 9	By 7	By 8	By 6
1. 2467	6. 6935	11. 6238	16. 6294
2. 3258	7. 9186	12. 1459	17. 7386
3. 9614	8. 2734	13. 9345	18. 9281
4. 2836	9. 8567	14. 2764	19. 4936
5. 9214	10. 2137	15. 3285	20. 9275

Divide 8 examples in one minute:

By 8	By 9	By 7	By 6
21. 8143	25. 8769	29. 8637	33. 8425
22. 2695	26. 2893	30. 2049	34. 6439
23. 7378	27. 6241	31. 9267	35. 9375
24. 6291	28. 7083	32. 7328	36. 8162

Spinning the Arrow

Make a circle of cardboard. Place numbers from 0 to 12, omitting 1, at regular intervals around the circumference. Fasten an arrow loosely in the center. Each child spins the arrow, multiplies the number to which the arrow points by a given number, and adds a second given number. For example, one child spins, multiplies the indicated number (say 9) by 6 and adds 5; another child spins and multiplies 12 by 6 and adds 5.



MULTIPLICATION BY TWO-FIGURE NUMBERS

1. Multiply 64 by 23.

		Short Form
Multiplicand	64	64
Multiplier	23	23
1st partial product	192 = 3 × 64	192
2d partial product	1280 = 20 × 64	128
Entire product	1472 = 23 × 64	1472

In practice the 0 in the second partial product is omitted, and 1280 is written as 128 *tens* by placing the right-hand figure of that product in *tens*' place.

The number multiplied is called the **multiplicand**.

The number showing how many times the multiplicand is taken is called the **multiplier**.

The result in multiplication is called the **product**.

2.	3.	4.	5.
327	203	6004	3060
35	42	73	89
1635	406	18012	27540
981	812	42028	24480
11445	8526	438292	272340

Multiply:

	a	*b*	*c*	*d*	*e*
6.	603	645	863	765	806
	24	32	24	35	43
7.	908	306	609	967	867
	23	76	79	47	39

MULTIPLICATION

Multiply:

1. 426 by 23	10. 634 by 37	19. 9006 by 48
2. 372 by 41	11. 298 by 73	20. 2694 by 75
3. 256 by 33	12. 604 by 48	21. 8002 by 38
4. 307 by 32	13. 729 by 40	22. 4293 by 67
5. 269 by 43	14. 903 by 86	23. 9128 by 39
6. 307 by 27	15. 694 by 79	24. 2807 by 74
7. 538 by 36	16. 928 by 89	25. 6293 by 56
8. 736 by 63	17. 726 by 75	26. 4060 by 13
9. 487 by 52	18. 349 by 28	27. 2734 by 27

Announce products at sight:

	a	*b*	*c*	*d*
28.	50×90	20×20	60×60	20×80
29.	80×70	30×30	70×70	40×30
30.	90×70	40×40	80×80	70×60
31.	60×50	50×50	90×90	70×40

Multiply:

32. 463 by 73	39. 9869 by 84	46. 8693 by 28
33. 938 by 84	40. 3278 by 93	47. 9281 by 39
34. 697 by 95	41. 9009 by 49	48. 7375 by 47
35. 893 by 96	42. 6075 by 74	49. 4069 by 56
36. 975 by 89	43. 8709 by 56	50. 9008 by 98
37. 863 by 98	44. 6003 by 43	51. 8090 by 79
38. 798 by 76	45. 5098 by 79	52. 7659 by 86

MULTIPLICATION

1. Multiply 694 by 326.

		Short Form
694		694
326		326
4164 =	6×694	4164
13880 =	20×694	1388
208200 =	300×694	2082
226244 =	326×694	226244

When multiplying by 3 hundreds, write the partial product as 2082 *hundreds* by placing the first figure of that product under *hundreds*.

Multiply:

2. 462	4. 283	6. 619	8. 543
375	243	128	264
3. 475	5. 267	7. 387	9. 476
325	364	918	842

10. 465 by 327	17. 538 by 147	24. 467 by 275
11. 289 by 943	18. 249 by 316	25. 839 by 843
12. 568 by 769	19. 957 by 827	26. 761 by 972
13. 987 by 938	20. 734 by 695	27. 394 by 867
14. 478 by 783	21. 933 by 783	28. 445 by 944
15. 925 by 867	22. 629 by 894	29. 967 by 746
16. 387 by 591	23. 933 by 819	30. 397 by 815

31. Announce products at sight:

20×40 50×70 12×12 20×30

MULTIPLICATION

1. Multiply 273 by 304.

		Short Form
273		273
304		304
1092	= 4 times 273	1092
81900	= 300 times 273	819
82992	= 304 times 273	82992

Do not write the naughts in units and tens in the second partial product, as in the first illustration.

When multiplying by 3 hundred, write the partial product as 819 hundreds by placing the right-hand figure of that product in hundreds' place.

Multiply:

	a	*b*	*c*	*d*	*e*
2.	316	275	428	506	709
	502	306	405	307	508
3.	243	709	608	705	908
	308	504	209	804	607

4. Use as the multiplier the number that will require fewer partial products.

5. Multiply 278 by 480.

278	6. $746 \times 350 = ?$
480	7. $296 \times 480 = ?$
22240	8. $374 \times 240 = ?$
1112	9. $604 \times 347 = ?$
133240	10. $200 \times 569 = ?$

REVIEW OF SHORT DIVISION

Answer at sight:

1. 2)32 3)48 4)44 5)35 5)75

2. 6)72 7)147 8)872 9)3699 8)4056

Give answers quickly:

3. $\frac{1}{2}$ of 16; 18; 26; 28; 32; 36; 40.
4. $\frac{1}{3}$ of 24; 27; 36; 18; 60; 90; 120.
5. $\frac{1}{4}$ of 48; 24; 60; 72; 36; 44; 56.
6. $\frac{1}{5}$ of 60; 55; 100; 150; 75; 45; 65.
7. $\frac{1}{6}$ of 72; 96; 84; 24; 48; 240; 36.
8. $\frac{1}{7}$ of 84; 91; 49; 63; 105; 350; 2100.
9. $\frac{1}{8}$ of 96; 72; 640; 960; 560; 120; 880.
10. $\frac{1}{9}$ of 108; 135; 360; 720; 54; 7209; 1080.
11. $\frac{1}{10}$ of 100; 120; 130; 190; 1250; 1950; 1780.
12. $\frac{1}{11}$ of 132; 88; 99; 77; 1100; 1320; 1210.
13. $\frac{1}{12}$ of 144; 288; 96; 84; 960; 840; 1080.

Divide and test:

14. 11)6303 11)2244 11)2882 11)6699

15. 12)96840 12)89640 12)6072 12)9060

Give quotients at sight:

16. 8)96 9)72 10)190 11)121 12)96

LONG DIVISION

1. Divide 240 by 15.

16 Quotient.
Divisor 15)240 Dividend.
15
90
90
0

In long division the quotient is placed *over* the dividend. 15 is contained in 24, 1 time. Write the 1 in the quotient over the 4. Multiply 15 by 1, placing the product, 15, under 24. Subtract 15 from 24. The remainder is 9. Bring down the next figure, 0. 15 is contained in 90, 6 times. Multiply 15 by 6, placing the product, 90, under 90. As there is no remainder, the quotient is 16.

The number divided is called the **dividend.**

The number by which we divide is called the **divisor.**

The answer in division is called the **quotient.**

Divide:

21 Ans.	209 Ans.	24 Ans.
2. 13)273	3. 25)5225	4. 21)504
26	50	42
13	225	84
13	225	84

STEPS IN EX. 4

1. Divide 50 by 21.
2. Write quotient figure.
3. Multiply 21 by 2.
4. Subtract 42 from 50.
5. Bring down next figure.

Test. $24 \times 21 = 504$.

5. Divide 441 by 21; 672 by 21; 903 by 21.

FINDING THE QUOTIENT FIGURE IN DIVISION

Think how many times the first figure of the divisor is contained in the first figure of the dividend. The number will be the first figure of the quotient.

1. $252 \div 21$
2. $525 \div 21$
3. $861 \div 21$
4. $714 \div 21$
5. $651 \div 21$
6. $357 \div 21$
7. $504 \div 21$
8. $2398 \div 21$
9. $2625 \div 21$

Think how many times the first figure of the divisor is contained in the first figure, or in the first two figures, of the dividend. The number will be the first figure of the quotient.

10. $713 \div 31$
11. $899 \div 31$
12. $6727 \div 31$
13. $8323 \div 41$
14. $7061 \div 23$
15. $9269 \div 23$
16. $5028 \div 42$
17. $1344 \div 42$
18. $6831 \div 33$
19. $1984 \div 32$
20. $2272 \div 32$
21. $1683 \div 51$

22. Divide 819 by 21.

$$\begin{array}{r} 4 \\ 21\overline{)819} \\ \underline{84} \end{array}$$

Since the product of the divisor and quotient is greater than 81, the quotient figure is *too large*. Try a smaller quotient figure.

$$\begin{array}{r} 39 \\ 21\overline{)819} \\ \underline{63} \\ 189 \\ \underline{189} \end{array}$$

23. Divide 651 by 21.

$$\begin{array}{r} 2 \\ 21\overline{)651} \\ \underline{42} \\ 23 \end{array}$$

Since the remainder is greater than the divisor, the quotient figure is *too small*. Try a larger quotient figure.

$$\begin{array}{r} 31 \\ 21\overline{)651} \\ \underline{63} \\ 21 \\ \underline{21} \end{array}$$

LONG DIVISION

Divide and test:

1. 21)882	13. 23)575	25. 33)462	37. 43)1333
2. 21)903	14. 23)736	26. 33)858	38. 43)6880
3. 21)504	15. 23)966	27. 33)561	39. 43)9460
4. 21)819	16. 23)138	28. 33)627	40. 43)1376
5. 21)315	17. 31)775	29. 41)943	41. 51)1683
6. 21)567	18. 31)744	30. 41)2296	42. 51)3672
7. 21)399	19. 31)899	31. 41)1107	43. 51)3264
8. 21)441	20. 31)217	32. 41)1435	44. 51)1428
9. 22)880	21. 32)672	33. 42)1008	45. 52)1508
10. 22)638	22. 32)928	34. 42)1596	46. 52)2288
11. 22)352	23. 32)160	35. 42)1680	47. 53)2385
12. 22)660	24. 32)192	36. 42)1722	48. 53)1908

49. If a railroad trackman walks 13 miles each day, how long will it take him to walk 676 miles?

50. If there are 496 ounces in 31 pounds, how many ounces are there in 1 pound?

51. If a bushel of oats weighs 32 lb., how many bushels will weigh 28,640 lb.?

52. How long will it take a train that travels 31 miles an hour to go a distance of 279 miles?

53. How many hours are there in 840 minutes?

54. There are 32 quarts in a bushel. How many bushels are there in 6912 quarts?

LONG DIVISION

1. Divide 7416 by 25.

$$\begin{array}{r} 296\tfrac{16}{25} \text{ Quotient} \\ 25\overline{)7416} \\ 50 \\ \hline 241 \\ 225 \\ \hline 166 \\ 150 \\ \hline 16 \text{ remainder} \end{array}$$

Write the remainder over the divisor, and annex it to the right of the quotient.

Test. $296 \times 25 = 7400$; $7400 + 16 = 7416$.

$16 \div 25 = \frac{16}{25}$.

Divide and test:

2. 2397 by 51	11. 2542 by 41	20. 2058 by 27
3. 3888 by 86	12. 3567 by 87	21. 2668 by 31
4. 1302 by 21	13. 1281 by 21	22. 3592 by 43
5. 2945 by 38	14. 1703 by 27	23. 2047 by 83
6. 3213 by 13	15. 3034 by 46	24. 6938 by 94
7. 1827 by 27	16. 4697 by 61	25. 7159 by 39
8. 3007 by 36	17. 4368 by 98	26. 4918 by 94
9. 6256 by 81	18. 4544 by 76	27. 8168 by 86
10. 5096 by 95	19. 2867 by 61	28. 8925 by 28

29. Find the number of barrels of oil, 51 gallons each, that can be filled from a vessel containing 408 gallons.

30. If the vessel contained 412 gal., how many barrels could be filled and how many gallons of oil would be left?

LONG DIVISION

1. Divide 13892 by 23.

$$\begin{array}{r} 604 \\ 23\overline{)13892} \\ \underline{138} \\ 92 \\ \underline{92} \end{array}$$

What is the product of 6×23? Is there any remainder? What is the next operation? Does 9 contain 23? Since 9 does not contain 23, write 0 in the quotient, and bring down 2, making the number to be divided 92.

Find quotients and test:

2. $26322 \div 46$	9. $23229 \div 29$	16. $56079 \div 73$
3. $31356 \div 39$	10. $73784 \div 92$	17. $45825 \div 65$
4. $23641 \div 47$	11. $15631 \div 77$	18. $19844 \div 49$
5. $33522 \div 37$	12. $36792 \div 73$	19. $19266 \div 38$
6. $31590 \div 45$	13. $58056 \div 82$	20. $83396 \div 98$
7. $49248 \div 81$	14. $67596 \div 74$	21. $41157 \div 51$
8. $20130 \div 66$	15. $16685 \div 54$	22. $15100 \div 25$

Give quotients at sight:

23. $64 \div 32$	30. $200 \div 20$	37. $90 \div 45$
24. $96 \div 48$	31. $70 \div 35$	38. $60 \div 20$
25. $40 \div 20$	32. $45 \div 15$	39. $48 \div 24$
26. $50 \div 25$	33. $46 \div 23$	40. $56 \div 28$
27. $60 \div 30$	34. $56 \div 28$	41. $63 \div 21$
28. $90 \div 45$	35. $99 \div 33$	42. $84 \div 21$
29. $100 \div 50$	36. $64 \div 32$	43. $62 \div 31$

DRILL IN MULTIPLICATION AND DIVISION

Multiply and test:

1.	8465		*a* 22
2.	7645		*b* 45
3.	8741		*c* 50
4.	9860		*d* 86
5.	8425	by	*e* 76
6.	9654		*f* 98
7.	7869		*g* 56
8.	9765		*h* 69
9.	4875		*i* 97
10.	8420		*j* 89

Form 100 problems by multiplying each multiplicand by each multiplier, as:

1 *a* $22 \times 8465 = ?$

1 *d* $86 \times 8465 = ?$

6 *e* $76 \times 9654 = ?$

11. Divide 969 by 23.

$$23\overline{)969}\quad 42\tfrac{3}{23}$$

92

49

46

3

Test. — $42 \times 23 = 966$

$966 + 3 = 969$

12. Divide 969 by 24.

$$24\overline{)969}\quad 40\tfrac{9}{24}$$

96

9

Divide and test:

13.	84765		*a* 86
14.	57672		*b* 78
15.	80720		*c* 91
16.	50724	by	*d* 59
17.	60925		*e* 72
18.	86412		*f* 67
19.	76412		*g* 82
20.	83456		*h* 65

Form 64 problems by dividing each of the dividends by each of the divisors, thus:

13 *a* $84765 \div 86 = ?$

13 *c* $84765 \div 91 = ?$

18 *e* $86412 \div 72 = ?$

MULTIPLICATION

Multiply:

1. 426 by 23	10. 634 by 37	19. 9006 by 48
2. 372 by 41	11. 298 by 73	20. 2694 by 75
3. 256 by 33	12. 604 by 48	21. 8002 by 38
4. 307 by 32	13. 729 by 40	22. 4293 by 67
5. 269 by 43	14. 903 by 86	23. 9128 by 39
6. 307 by 27	15. 694 by 79	24. 2807 by 74
7. 538 by 36	16. 928 by 89	25. 6293 by 56
8. 736 by 63	17. 726 by 75	26. 4060 by 13
9. 487 by 52	18. 349 by 28	27. 2734 by 27

Announce products at sight:

	a	*b*	*c*	*d*
28.	50×90	20×20	60×60	20×80
29.	80×70	30×30	70×70	40×30
30.	90×70	40×40	80×80	70×60
31.	60×50	50×50	90×90	70×40

Multiply:

32. 463 by 73	39. 9869 by 84	46. 8693 by 28
33. 938 by 84	40. 3278 by 93	47. 9281 by 39
34. 697 by 95	41. 9009 by 49	48. 7375 by 47
35. 893 by 96	42. 6075 by 74	49. 4069 by 56
36. 975 by 89	43. 8709 by 56	50. 9008 by 98
37. 863 by 98	44. 6003 by 43	51. 8090 by 79
38. 798 by 76	45. 5098 by 79	52. 7659 by 86

MULTIPLICATION

1. Multiply 694 by 326.

		Short Form
694		694
326		326
4164 =	6×694	4164
13880 =	20×694	1388
208200 =	300×694	2082
226244 =	326×694	226244

When multiplying by 3 hundreds, write the partial product as 2082 *hundreds* by placing the first figure of that product under *hundreds*.

Multiply:

2. 462	4. 283	6. 619	8. 543
375	243	128	264
3. 475	5. 267	7. 387	9. 476
325	364	918	842

10. 465 by 327	17. 538 by 147	24. 467 by 275
11. 289 by 943	18. 249 by 316	25. 839 by 843
12. 568 by 769	19. 987 by 827	26. 761 by 972
13. 987 by 938	20. 734 by 695	27. 398 by 867
14. 478 by 783	21. 938 by 783	28. 485 by 984
15. 925 by 867	22. 629 by 894	29. 967 by 786
16. 387 by 591	23. 938 by 619	30. 397 by 815

31. Announce products at sight:

20×40	50×70	12×12	80×90

MEASURES OF LENGTH OR DISTANCE

1. Measure a rod on the floor of the schoolroom. Pace the rod and tell approximately the number of paces to a rod.

2. Pace the width of the plot of ground on which the school is located and estimate the distance in rods.

3. By actual experience find the number of minutes required for you to walk one mile.

4. If you live near your school, determine the distance of your home from the school, either by pacing, or by finding the time required to walk that distance.

5. Estimate the length and width of the school courts or playgrounds. Test your estimate by actual measurement.

6. Estimate the distance between your home and the home of a playmate. Test by actual measurement.

7. If you live in the city, count the number of blocks between your home and the school. About how far do you live from the school building?

8. Find the distance between two street lights. Estimate the number of street lights required for one mile.

9. Find the distance between two telegraph or telephone poles. How many poles that distance apart would be required for a mile?

10. If Newark and Trenton are 50 miles apart, how many poles that distance apart would be required to extend telegraph wires between the two cities?

PROBLEMS IN LENGTH OR DISTANCE

1. A sheet of paper is 8 inches in width and 15 inches in length. What is the distance around it in inches? in feet and inches over?

The distance around an oblong or rectangle is called its **perimeter.**

2. Measure the distance around the blackboard; around the teacher's desk; around the schoolroom floor.

3. Measure the perimeter of your schoolroom.

4. Jay wishes to build a wire netting fence to keep in the chickens around a lot 40 ft. wide and 90 ft. long. How many feet of fence are necessary?

5. The reading table in the library is 4 ft. long and 3 ft. wide. What is its perimeter in feet? in yards?

6. What is the perimeter of a field 40 rd. square? of a field 30 rd. by 40 rd.?

7. John's father owns a corner lot 125 ft. long and 25 ft. wide. What length of walk will it take for the front and side?

8. 36 in. = —— ft.
9. 10 ft. = —— in.
10. 12 ft. = —— yd.
11. 3 yd. = —— ft.
12. 11 yd. = —— rd.
13. 2 rd. = —— yd.
14. 640 rd. = —— mi.
15. 3 mi. = —— rd.
16. 10560 ft. = —— mi.
17. 3 mi. = —— ft.
18. 960 rd. = —— mi.
19. 10 mi. = —— rd.

MEASURES OF SURFACE

1. Draw a square inch; a square foot. What two things show that it is a *square* inch or a *square* foot?

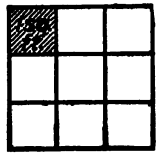
2. Separate each side of a square foot into 12 equal parts. Connect these points by straight lines. What is the size of each square? the name of each square? How many square inches equal one square foot?

144 square inches = 1 square foot

3. Draw on the blackboard a square yard. What two things show that it is a *square* yard?

Let one inch represent a foot. How long, then, is the side of the square that represents a square yard?

4. Represent a square yard by a square, each side of which is $\frac{3}{4}$ inch long. Then $\frac{1}{4}$ inch represents 1 foot.



How long is each side of a square yard? How many square feet are there in each row? in the three rows? How many square feet are there, then, in 1 square yard?

9 sq. ft. = 1 sq. yd.

5. How many square inches are there in 8 sq. ft.?

6. In 864 sq. in. how many square feet are there?

7. Find the number of square feet in 10 sq. yd.

8. Estimate the number of square yards in the floor of the schoolroom. Test by actual measurement.

PROBLEMS IN SURFACE

1. Make a drawing on a scale of 1 inch to 1 foot to show the top of the teacher's desk 4 ft. by 6 ft.

2. The blackboard is 4 ft. wide and 20 ft. long. Make a diagram on a scale of 1 inch to 2 feet to show the surface.

3. The school grounds are 200 feet wide and 300 feet long. Make a drawing of the grounds on a scale of 1 inch to 50 feet.

SUGGESTION. If 1 in. represents 50 ft., 4 in. represent 200 ft. and 6 in. represent 300 ft.

4. Draw an oblong 4 in. by 4 in. and tell the number of square inches it contains.

5. A rug is 9 ft. by 12 ft. Make a drawing on a convenient scale to show this. How many square feet does it contain?

6. If your schoolroom floor is 30 ft. by 40 ft., how many square feet does it contain?

7. Measure your rugs and rooms at home and make diagrams on a convenient scale to show their sizes.

8. How many square feet are there in the top of a table 4 ft. by 2 ft.?

9. How many square inches are there in a surface containing 3 sq. ft.?

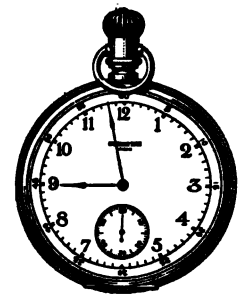
10. 288 sq. in. = —— sq. ft.

11. 5 sq. ft. = —— sq. in.

12. 27 sq. ft. = —— sq. yd.

13. 5 sq. yd. = —— sq. ft.

MEASURES OF TIME



1. Write the days of the week and the months of the year, with their abbreviations.

2. Observe that the **second hand** moves over 60 small or second spaces, while the minute hand moves over one minute space.

3. Memorize this table:

60 seconds (sec.) = 1 minute (min.)
60 minutes = 1 hour (hr.)
24 hours = 1 day (da.)
365 days = 1 year (yr.)

September, November, April, and June have each 30 days. All the others except February have 31 days each. February usually has 28 days. A year that has 366 days is called a **leap year.** In leap year February has 29 days.

4. Memorize this rime:

Thirty days have September,
April, June, and November.
All the rest have thirty-one,
Save February, which alone
Has twenty-eight; and one day more
We add to it one year in four.

Change:

5. 3 min. to sec.
6. 6 da. to hours.
7. 7 hr. to minutes.
8. 3 da. 6 hr. to hr.
9. 10 wk. 6 da. to da.

10. How many days are there in April, May, and June? in November, December, and January?

PROBLEMS IN TIME

1. Name the months in the year that have 28 days; 29 days; 30 days; and 31 days.

2. John has 15 minutes recess morning and afternoon and 1 hour at noon. How many minutes is that?

3. Mary studies 45 minutes each evening for 6 nights a week. How many minutes is that? About how many hours is that?

4. Harry works 30 minutes each day at the store. How many minutes is that in 6 days? How many hours is it?

5. Add in minutes $\frac{1}{4}$ hr. and $\frac{1}{2}$ hr.

6. Susan helps her mother 15 minutes in the morning and 20 minutes in the evening. How many minutes is that each day?

7. Clyde averages 30 minutes in home study for 180 school days. How many hours does that equal?

8. A hammer makes 2 strokes each second. How many strokes does it make in a minute?

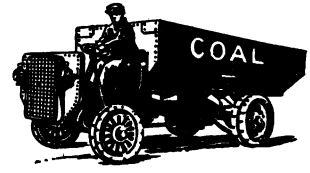
9. William gets a book from the library June 2, which is to be returned June 16. The book is returned June 30 with a charge of 2¢ per day overtime. How much does William pay?

10. May retires at 8:40 P.M. and rises at 6:45 A.M. How many hours is she in bed?

11. Estimate how nearly you can count a *second* of time.

MEASURES OF WEIGHT

1. Name some articles bought by the **ounce (oz.)**; by the **pound.**



2. How many ounces are there in 1 pound? in 10 pounds?

Coal, hay, sand, plaster, etc., in large quantities, are sold by the **ton** of 2000 **pounds.**

3. Memorize this table:

16 oz. = 1 pound (lb.)
2000 pounds = 1 ton (T.)

4. How many pounds of coal are there in 8 tons? in 7 tons? in 12 tons?

5. Find the number of tons and pounds in 7460 lb. of ice.

6. A freight car carries 60,000 pounds of freight. How many tons does it carry?

7. A dealer buys 150 bales of hay, averaging 90 pounds to the bale. How many tons and pounds over does he buy?

8. 32 oz. = —— lb.
9. 64 oz. = —— lb.
10. 5 lb. = —— oz.
11. 4 lb. = —— oz.
12. 4000 lb. = —— T.
13. 8000 lb. = —— T.
14. 5 T. = —— lb.
15. 10 T. = —— lb.

PROBLEMS IN WEIGHT

1. At 3 cents an ounce, how much will 1 pound of mustard cost?

2. 2 tons of rolled oats were packed in pound packages. How many packages were there?

3. A load of hay weighed 3000 pounds. How many tons did it weigh?

4. Find the weight of 20 kegs of nails, each weighing 100 lb.

5. A man delivered 3 tons of coal in bags containing 100 lb. each. How many bags of coal were there?

6. How much will $1\frac{1}{2}$ lb. cheese cost at 12¢ per pound?

7. How many ounces of butter are there in 24 lb.?

8. How much will $1\frac{1}{2}$ lb. butter cost at 32¢ per lb.?

9. John's father got a coal bill showing 6500 lb. of soft coal. How many tons and pounds over is that?

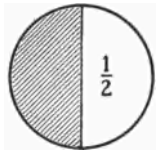
10. How many pounds are there in $1\frac{1}{2}$ tons? $1\frac{1}{4}$ tons? $2\frac{1}{2}$ tons?

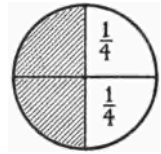
11. Will sold 340 eight-pound baskets of grapes. How many tons and pounds over did they make?

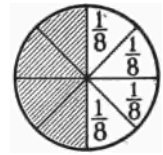
12. Susan's mother raises 10 lb. 10 oz. of onion seed in the garden. How many 2-oz. packages will it make?

13. John weighs 101 lb. 9 oz.; and James 111 lb. 10 oz. How many ounces more does James weigh than John?

HALVES, FOURTHS, AND EIGHTHS







1. $\frac{1}{2} = \frac{?}{4} = \frac{?}{8}$
2. $\frac{1}{2} + \frac{1}{2} = \frac{?}{2}$
3. $\frac{1}{4} + \frac{2}{4} = \frac{?}{4}$
4. $\frac{1}{4} + \frac{1}{2} = \frac{?}{4}$
5. $\frac{2}{4} = \frac{?}{8}$
6. $\frac{2}{8} + \frac{2}{8} = \frac{?}{8}$
7. $\frac{4}{4} = \frac{?}{8}$
8. $\frac{2}{2} = \frac{?}{8}$
9. $\frac{4}{8} = \frac{?}{4}$
10. $\frac{6}{8} = \frac{?}{4}$

11. Draw two lines of equal length. Divide one into fourths and the other into eighths. Refer to them in answering the following:

a. Which is greater, $\frac{2}{4}$ or $\frac{3}{8}$? How much greater is it?

b. How much greater is a fourth than an eighth?

c. Compare $\frac{3}{4}$ with $\frac{3}{8}$; $\frac{1}{2}$ with $\frac{1}{4}$.

d. From $\frac{4}{8}$ subtract $\frac{1}{4}$.

e. Compare $\frac{6}{8}$ with $\frac{3}{4}$.

f. How much is 3 times one fourth?

g. How many times must an eighth be taken to make one half? to make one fourth?

12. If you cut $\frac{1}{2}$ of a yard from $\frac{3}{4}$ of a yard of ribbon how much ribbon will be left?

HALVES, FOURTHS, AND EIGHTHS

1. $\frac{1}{2}$ qt. = —— pt.
2. $\frac{1}{4}$ gal. = —— qt.
3. $\frac{1}{8}$ pk. = —— qt.
4. $\frac{1}{2}$ lb. = —— oz.
5. $\frac{1}{2}$ hr. = —— min.
6. $\frac{1}{4}$ hr. = —— min.
7. $\frac{1}{8}$ da. = —— hr.
8. $\frac{1}{2}$ doz. = ——
9. $\frac{1}{4}$ doz. = ——
10. $\frac{1}{2}$ gal. = —— qt.
11. $\frac{1}{2}$ min. = —— sec.
12. $\frac{1}{4}$ da. = —— hr.
13. $\frac{1}{4}$ pk. = —— qt.
14. $\frac{1}{4}$ lb. = —— oz.
15. $\frac{1}{8}$ lb. = —— oz.
16. $\frac{1}{2}$ mi. = —— ft.
17. $\frac{1}{2}$ mi. = —— rd.
18. $\frac{1}{2}$ sq. ft. = —— sq. in.
19. $\frac{1}{4}$ mi. = —— ft.
20. $\frac{1}{8}$ mi. = —— ft.

21. If each of three children receives $\frac{1}{4}$ of a pie how much do the children receive all together?

22. If I study my lessons $\frac{3}{4}$ hr. how many minutes do I study?

23. If $\frac{1}{4}$ yd. of tape is cut from $\frac{3}{8}$ yd. how much remains?

24. How much lace is there in 2 remnants, one of which measures $\frac{1}{2}$ yd. and the other $\frac{1}{4}$ yd.?

25. Find the cost of $1\frac{1}{2}$ qt. of milk at 8¢ a quart.

26. How much must I pay for $\frac{1}{4}$ doz. buttons at 12¢ a dozen?

27. At 80¢ a pound find the cost of $\frac{1}{4}$ lb. of candy.

TESTS

a

1. $462 \times 306 = ?$
2. Write in words 387642.
3. Subtract \$.87 from \$126.
4. $8370 \div 77 = ?$
5. Find $\frac{7}{8}$ of 6472.

b

1. From \$800 take \$786.47.
2. Divide 2543 by 74.
3. Which is greater, $\frac{3}{4}$ or $\frac{7}{8}$?
4. $782 \times 700 = ?$
5. $9450 \div 86 = ?$

c

1. Write in figures one hundred twenty thousand.
2. Find the difference between 3847 and 9600.
3. $66800 \div 71 = ?$
4. Show $\frac{4}{5}$ of a line.
5. $876 \times 290 = ?$

d

1. How much greater is 3645 than 2709?
2. $647 \times 316 = ?$
3. $33075 \div 82 = ?$
4. Find $\frac{8}{9}$ of 1089.
5. Write in figures seven thousand six.

e

1. \$364 − \$297.68 = ?
2. $74937 \div 807 = ?$
3. $120 \times \$63.84 = ?$
4. Write in words 600710.
5. Divide a circle into eight equal parts and tell what each part is called.

f

1. Write the Roman number for 87.
2. How much must be added to 800 to make 964?
3. $42164 \div 221 = ?$
4. How much greater is $\frac{1}{2}$ than $\frac{1}{4}$?
5. $207 \times \$300 = ?$

FOURTH GRADE — SECOND HALF

READING AND WRITING NUMBERS

1. Read:

a	*b*	*c*	*d*
287640	846591	458000	387004
29600	77477	378429	370605
100374	960000	91404	400204

2. Write the numbers in column "*a*" from dictation, and add them; in column "*d*."

3. Read:

a	*b*	*c*
$647.84	$100000.00	$3648.98
2967.20	25647.29	280.47
3004.05	19614.18	35470.90
23764.00	237412.10	3645.32

4. Write the numbers in column "*c*" from dictation, and add them.

5. Read the following Roman numbers:

CXIX	LXVIII	CCCX	XXXIX
CCXLV	CXCIII	LXXI	LIV

D = 500 M = 1000

6. Write the Roman number for

1400 1500 1600 900 1913 1492

DRILL IN ADDITION

Add (when written) 4 problems in 1½ minutes:

	a	*b*	*c*	*d*
1.	$751.04	$146.80	$345.75	$187.90
	690.20	12.96	187.60	64.72
	404.72	842.90	962.45	124.87
	812.42	950.45	878.72	671.82
	900.25	2.75	964.54	48.96
	10.48	24.87	12.68	702.84
2.	$964.77	$420.41	$862.41	$864.12
	844.76	703.45	742.87	246.98
	99.75	802.60	368.23	107.64
	184.65	12.87	467.28	963.66
	209.87	908.72	643.82	478.23
	84.72	885.88	782.95	682.87
	104.88	225.12	328.15	478.24
	84.91	380.96	841.62	332.85
3.	$844.62	$10642.83	$321.62	$12891.42
	256.48	469.27	41.68	117.68
	741.87	184.64	769.62	49.64
	369.73	926.48	186.47	961.41
	108.42	12.93	524.93	87.83
	957.68	193.67	834.71	113.22
	87.64	446.72	221.34	487.64
	123.96	689.38	455.26	923.06

BANK DEPOSITS

A bank is an institution that receives and loans money.

1. A bank received deposits as follows:
Monday, $4126.50;
Tuesday, $2842.35;
Wednesday, $5045.60;
Thursday, $3862.41;
Friday, $6065.70;
Saturday, $7564.72.
Find the total deposits for the week.

2. It paid out during the week $24862.43. How much more was received than was paid out?

3. On June 1, F. G. Bishoff had a balance on hand of $4232.44. During the month he deposited $1642.80, and checked on his account to the amount of $2214.60. What was his balance in bank July 1?

Find the balances:

	Deposits	Payments		Deposits	Payments
4.	$216443.62	$111861.74	5.	$15419.21	$14000.00
	112384.76	210987.65		16987.91	9044.89
	211129.82	2940.74		6456.75	1055.20
	114781.64	172.67		14381.50	10105.00
	122046.95	127642.94		3102.62	2056.98
	336847.68	1654.87		10000.00	8401.40

DRILL IN SUBTRACTION

Subtract and test 5 problems in 1 minute.

	a	*b*	*c*	*d*
1.	\$860.45	\$874.61	\$724.82	\$870.62
	178.62	126.42	109.87	188.94
2.	\$684.26	\$962.41	\$921.08	\$700.64
	397.84	802.96	120.09	188.96
3.	\$784.12	\$908.07	\$916.25	\$864.30
	479.63	194.72	721.24	497.86
4.	\$876.42	\$900.40	\$921.11	\$422.33
	91.76	87.80	888.66	188.88
5.	\$600.03	\$744.44	\$800.55	\$111.21
	187.69	299.99	288.85	108.89
6.	\$700.77	\$644.41	\$854.32	\$765.43
	188.99	387.64	123.45	112.34
7.	\$842.16	\$964.21	\$841.22	\$742.24
	199.97	188.74	108.62	604.28
8.	\$914.79	\$305.00	\$965.06	\$821.00
	549.86	128.95	578.98	367.89

DRILL IN SUBTRACTION

Write, subtract, and test 4 problems in $2\frac{1}{2}$ minutes:

	a	*b*	*c*	*d*
1.	\$843.87	\$376.47	\$48892.00	\$2498.73
	632.17	248.02	15079.63	519.71
2.	\$600.01	\$246.91	\$32171.19	\$7739.82
	289.81	19.17	16593.40	7015.09
3.	\$940.09	\$1497.63	\$45269.79	\$9999.86
	16.41	900.75	27319.27	1305.17
4.	\$632.25	\$741.20	\$37461.27	\$5020.37
	245.19	523.18	19842.07	2456.78
5.	\$95.33	\$61.05	\$649.08	\$27004.49
	49.27	37.97	500.16	19017.63
6.	\$82.36	\$79.87	\$532.98	\$75009.75
	19.36	27.93	403.61	69135.92
7.	\$80.16	\$65.32	\$763.55	\$97382.99
	25.31	13.27	300.01	39853.75
8.	\$67.35	\$51.27	\$983.27	\$32148.91
	59.32	27.75	742.19	14269.90
9.	\$90.00	\$86.95	\$836.92	\$33197.84
	37.17	14.75	775.48	19057.55

MULTIPLICATION OF DOLLARS AND CENTS

1. Multiply \$1.25 by 3.

\$1.25
3
\$3.75 = 375¢

In multiplying dollars and cents, place the decimal point in the product directly under the decimal point in the multiplicand. Write the dollar sign before the number of dollars.

2. Multiply 70¢ by 3.

70¢
3
210¢ = \$2.10.

3. Multiply \$.75 by 4.

\$ .75
4
\$3.00 = 300¢

Multiply:

	a	*b*	*c*	*d*	*e*
4.	\$3.50	\$3.05	\$6.05	\$9.40	\$7.04
	2	4	3	5	4
5.	\$.60	\$.08	74¢	49¢	95¢
	5	3	4	5	5

6. How much will 3 pecks of peaches cost at 65¢ a peck?

7. A messenger boy delivers 4 messages at 45¢ each. How much does he earn for his company?

8. If Mary earns \$4.75 a week in a department store, find her wages for 4 weeks.

9. At 1.50 apiece, find the cost of 6 tickets for a concert.

PRACTICAL PROBLEMS

Sale To-day

Eggs \$.37 a dozen	Cheese \$.18 a pound
Butter \$.32 a pound	Coffee \$.28 a pound
Potatoes \$2.65 a barrel	Tomatoes \$.75 a crate
Flour \$4.80 a barrel	Oranges \$.45 a dozen

At this sale how much must I pay for each of the following purchases?

1. 8 dozen eggs.
2. 7 pounds of cheese.
3. 4 barrels of potatoes.
4. 12 pounds of coffee.
5. 6 crates of tomatoes.
6. 2 barrels of flour.
7. 9 pounds of butter.
8. $1\frac{1}{2}$ pounds of butter.
9. 4 dozen eggs and 2 pounds of butter.
10. 1 barrel of flour and 3 crates of tomatoes.
11. 2 dozen oranges and 2 dozen eggs.

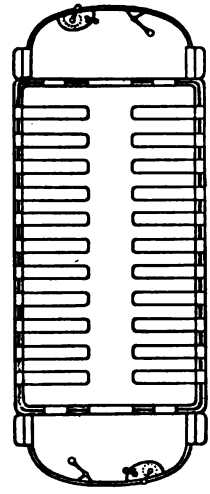
Multiply each of the following by 7; by 10; by 24; by 236.

	a	*b*	*c*	*d*
12.	\$4.27	\$618.	\$700.	\$5.35
13.	\$9.65	\$37.25	\$.87	\$6.75
14.	\$.48	\$384.	\$6.95	\$4.44
15.	\$.50	\$95.05	\$4.89	\$9.99

16. Find the cost of 2 dozen chairs at \$2.75 each.

17. It requires 40 yards of carpet for a certain room. How much will it cost at \$2.98 a yard?

PRACTICAL PROBLEMS



1. How many seats are there on each side of the car?

2. If 8 seats are vacant on each side, how many are occupied?

3. The conductor collected 75 fares on the first trip and 87 fares on the return trip. How many fares did he collect?

4. The fare is 5 cents. How much money did he collect on both trips?

5. A lady paid for herself and 5 children. She gave the conductor a half dollar. How much change should she receive?

6. Each seat will accommodate two persons. How many persons can be seated in the car?

7. The conductor earns $2.50 in a day. How much does he earn in 5 days?

8. The motorman is paid $2.75 a day. How much does he earn in 5 days? How much more does he earn in a day than the conductor?

9. The line is 8 miles long. How far does a car run in making 5 round trips?

10. On one trip each seat was occupied, and 5 persons had to stand. Find the amount of the fares for the trip.

PRACTICAL PROBLEMS

1. Find the cost of 5 yards of cloth at $.75 a yard.

2. Four boys deposited in the school bank as follows: $4.25, $6.93, $4.34, and $6.05. What was the entire deposit?

3. Julia went to the store with a twenty-dollar bill. She paid 75 cents a yard for 6 yards of oilcloth. How much had she left?

4. A box contains 360 oranges. If $\frac{1}{6}$ of them are bad, how many good ones are there in the box?

5. At 36 cents a dozen, how much will 5 dozen oranges cost?

6. At 24 cents a dozen, how much will 6 dozen oranges cost? How much change should a lady receive after paying for the oranges with a two-dollar bill?

7. Make a problem with: $8.25, $6.32, $6.56, and $5.

8. John paid a bill of $7.32 and had $6.54 remaining. How much had he at first?

9. If there are 28 lines on each page of a book, how many lines are there on 6 pages?

10. A furniture dealer bought 104 tables at $6 each. How much did they cost?

$$\begin{array}{r} 104 \\ \times\ 6 \\ \hline 624 \end{array} \quad \textit{Ans.}\ \$624$$

11. He also bought 75 lamps at $5 each. Find the cost.

MULTIPLICATION OF CONCRETE NUMBERS

Numbers that name objects are **concrete**; as 6 apples, 3 boys, 5 yards.

Numbers that do not name objects are **abstract**; as, 7, 9, 3.

1. Which of the following numbers are *abstract?* Which are *concrete?* 8; 6 eggs; $4; 5¢; 25; 4 feet.

2. Name the *multiplier* and the *multiplicand:*

$8	64 days	81 horses	72 oranges
×5	×4	×7	×3

The product must have the *same* name as the multiplicand. *The multiplier is always an abstract number.*

When two numbers are multiplied, the *number in the product* remains the same in whatever order the numbers are taken; thus, $7 \times 12 = 12 \times 7$.

3. How much do I earn in 125 days at $3 per day?

When the multiplier has more figures than the multiplicand, the product may be found as at the left, but the analysis should be given thus:

```
125
  3
375
```

In one day I earn $3.
In 125 days, I earn 125 × $3, or $375.

Find the cost of:

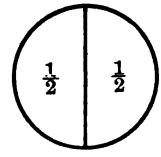
4. 319 days' work @ $3.
5. 817 tons coal @ $5.
6. 198 lb. meal @ 9¢.

How many:

7. Pints in 327 qt.?
8. Inches in 845 ft.?
9. Pecks in 164 bu.?

HALVES

1. Into how many parts has this circle been divided? What is the name of each part? Into how many halves can an object be divided?



2. 1 half apple + 1 half apple = ? $\$\frac{1}{2} + \$\frac{1}{2} = ?$

Find the sum of:

	a	*b*	*c*	*d*
3.	$1\frac{1}{2}$ gal.	$4\frac{1}{2}$ bu.	$5\frac{1}{2}$ yd.	$3\frac{1}{2}$ qt.
	3 gal.	$2\frac{1}{2}$ bu.	$4\frac{1}{2}$ yd.	$\frac{1}{2}$ qt.

4. Add:

$15\frac{1}{2}$
$9\frac{1}{2}$
$6\frac{1}{2}$
$31\frac{1}{2}$

$\frac{1}{2} + \frac{1}{2} = 1$; $1 + \frac{1}{2} = 1\frac{1}{2}$.

Write the fraction $\frac{1}{2}$, and add 1 to the whole numbers.

5. $4\frac{1}{2} + 27\frac{1}{2} + 3\frac{1}{2}$
6. $9\frac{1}{2} + 18\frac{1}{2} + 27\frac{1}{2}$
7. $11\frac{1}{2} + 25\frac{1}{2} + 42\frac{1}{2}$
8. $9 + 37\frac{1}{2} + 86\frac{1}{2}$

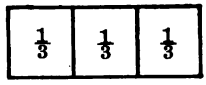
Insert the missing number. The number below the line is the sum.

	a	*b*	*c*	*d*	*e*	*f*
9.	$4\frac{1}{2}$	$7\frac{1}{2}$	$6\frac{1}{2}$	$8\frac{1}{2}$	$9\frac{1}{2}$	11
	?	?	?	?	?	?
	$10\frac{1}{2}$	$15\frac{1}{2}$	$7\frac{1}{2}$	$12\frac{1}{2}$	$18\frac{1}{2}$	$20\frac{1}{2}$

Subtract:

10.	$8\frac{1}{2}$	$4\frac{1}{2}$	$12\frac{1}{2}$	$11\frac{1}{2}$	$14\frac{1}{2}$	$62\frac{1}{2}$
	5	3	$10\frac{1}{2}$	$9\frac{1}{2}$	$7\frac{1}{2}$	37

THIRDS



1. How many thirds are there in this oblong? How many thirds are there in one of anything? in 1 yard? How many feet are there in 1 yard? What part of a yard is 1 foot? What part of a yard is 12 inches? How many thirds are there in 2 oranges?

Add:

2. $\frac{1}{3}+\frac{1}{3}=\frac{?}{3}$ $\frac{1}{3}+\frac{1}{3}+\frac{1}{3}=\frac{3}{3}$, or 1 $\frac{2}{3}+\frac{2}{3}+\frac{2}{3}=\frac{6}{3}$, or 2

	a	*b*	*c*	*d*	*e*
3.	$4\frac{1}{3}$	$6\frac{2}{3}$	$5\frac{1}{3}$	$8\frac{1}{3}$	$9\frac{1}{3}$
	$2\frac{2}{3}$	$1\frac{1}{3}$	4	$5\frac{1}{3}$	$7\frac{2}{3}$
4.	$8\frac{1}{3}$	$7\frac{2}{3}$	$9\frac{1}{3}$	7	12
	$10\frac{1}{3}$	$6\frac{2}{3}$	5	$8\frac{2}{3}$	$8\frac{1}{3}$

Find the missing number. The number below the line is the sum.

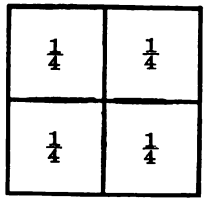
5.	$8\frac{2}{3}$	$9\frac{1}{3}$	7	$15\frac{1}{3}$	$8\frac{2}{3}$
	$?$	$?$	$?$	$?$	$?$
	$11\frac{2}{3}$	$14\frac{2}{3}$	$12\frac{2}{3}$	$18\frac{2}{3}$	$11\frac{2}{3}$

Subtract:

6.	$7\frac{2}{3}$	$8\frac{2}{3}$	$9\frac{2}{3}$	$18\frac{2}{3}$	$17\frac{2}{3}$
	3	$5\frac{1}{3}$	$4\frac{2}{3}$	$5\frac{2}{3}$	$9\frac{2}{3}$

7. I rubbed out $2\frac{2}{3}$ inches from a line $5\frac{2}{3}$ inches long. How long was the part remaining?

FOURTHS



1. Into how many parts has the square been divided? Give the name of each part. What is the difference between a quarter and a fourth of $1? of 1 pie? of 1 apple? Into how many fourths can any object be divided?

$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=$ how many fourths? $\frac{3}{4}$ gal. $+\frac{1}{4}$ gal. $=$?

Find the sum:

2. $\$ 2\frac{1}{4}+\$ \frac{3}{4}$
3. $6\frac{1}{4}+\frac{1}{4}$
4. $6\frac{1}{4}$ gal. $+\frac{3}{4}$ gal.
5. $3\frac{1}{4}$ pk. $+2\frac{2}{4}$ pk.
6. $8\frac{1}{4}$ bu. $+\frac{3}{4}$ bu.
7. $7\frac{3}{4}$ hr. $+1\frac{1}{4}$ hr.

Add:

	a	*b*	*c*	*d*	*e*	*f*
8.	$2\frac{1}{4}$	$6\frac{2}{4}$	$5\frac{1}{4}$	$3\frac{1}{4}$	$10\frac{2}{4}$	$12\frac{1}{4}$
	$3\frac{2}{4}$	$7\frac{3}{4}$	$6\frac{1}{4}$	$8\frac{1}{4}$	$7\frac{3}{4}$	9
	$5\frac{1}{4}$	$8\frac{3}{4}$	$25\frac{1}{4}$	$9\frac{1}{4}$	$8\frac{3}{4}$	$8\frac{3}{4}$
9.	11	$18\frac{3}{4}$	$19\frac{1}{4}$	$\frac{3}{4}$	$5\frac{1}{4}$	$20\frac{1}{4}$
	$14\frac{1}{4}$	$16\frac{2}{4}$	8	$\frac{3}{4}$	$6\frac{3}{4}$	8
	$27\frac{1}{4}$	$21\frac{3}{4}$	$62\frac{3}{4}$	$\frac{2}{4}$	17	$31\frac{3}{4}$

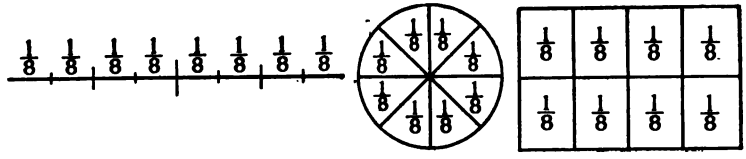
Complete:

10. $4\frac{1}{4}+?=9\frac{3}{4}$
11. $6\frac{3}{4}+?=8\frac{3}{4}$
12. $6\frac{1}{4}+?=11\frac{1}{4}$
13. $9\frac{3}{4}+?=13\frac{3}{4}$
14. $?+8\frac{1}{4}=15\frac{1}{4}$
15. $?+\frac{1}{4}=6\frac{2}{4}$

Find the difference:

16. $8\frac{1}{4}-7$
17. $16\frac{3}{4}-5\frac{1}{4}$
18. $23\frac{3}{4}-7\frac{3}{4}$
19. $9\frac{3}{4}-8\frac{1}{4}$
20. $16\frac{1}{4}-7\frac{1}{4}$
21. $12\frac{2}{4}-11\frac{2}{4}$
22. $19\frac{3}{4}-7\frac{1}{4}$
23. $16\frac{1}{4}-8$
24. $14\frac{1}{2}-7$

EIGHTHS



1. Into how many eighths can a whole unit be divided?

2. Compare $\frac{1}{2}$ and $\frac{4}{8}$ of a unit.

3. Compare $\frac{2}{4}$ and $\frac{4}{8}$ of a unit.

4. $\frac{2}{8}+\frac{1}{8}=\frac{?}{8}$.

5. $\frac{1}{8}$ is what part of $\frac{1}{4}$?

6. $\frac{6}{8}-\frac{3}{8}=\frac{?}{8}$.

Add:

7.	8.	9.	10.	11.
$3\frac{1}{8}$	$7\frac{3}{8}$	$6\frac{1}{8}$	$9\frac{1}{8}$	$5\frac{3}{8}$
$3\frac{1}{8}$	$8\frac{1}{8}$	$7\frac{1}{8}$	11	$12\frac{1}{8}$
$4\frac{1}{8}$	$9\frac{1}{8}$	$9\frac{2}{8}$	$6\frac{1}{8}$	$3\frac{1}{8}$

12. $\frac{3}{4}+\frac{2}{4}+\frac{3}{4}=\frac{8}{4}$, or 2 whole units; $\frac{3}{8}+\frac{7}{8}+\frac{6}{8}=$ how many whole units?

Subtract; then add:

13.	14.	15.	16.	17.
$10\frac{3}{8}$	$12\frac{3}{8}$	$27\frac{4}{8}$	$19\frac{2}{8}$	$36\frac{4}{8}$
$5\frac{2}{8}$	$6\frac{1}{8}$	$8\frac{3}{8}$	$6\frac{1}{8}$	$16\frac{3}{8}$

18.	19.	20.	21.	22.
$62\frac{5}{8}$	$63\frac{3}{8}$	$26\frac{4}{8}$	$18\frac{3}{8}$	$40\frac{3}{8}$
$31\frac{1}{8}$	$39\frac{1}{8}$	$24\frac{3}{8}$	$9\frac{3}{8}$	$20\frac{1}{8}$

PRACTICAL PROBLEMS

1. A dealer sold $2\frac{1}{4}$ tons of coal at one time and $3\frac{3}{4}$ tons at another time. How many tons did he sell?

2. From a barrel containing $31\frac{1}{2}$ gallons, 25 gallons were sold. How many gallons remained?

3. A dairyman sold in one month $1875\frac{1}{2}$ gallons of milk. He sold 250 gallons less the next month. How much did he sell the second month?

4. A farmer picked potatoes as follows: 23 bu., $24\frac{1}{2}$ bu., and $11\frac{1}{2}$ bu. How many bushels did he pick?

5. After selling $56\frac{1}{2}$ bu. of the potatoes, how many bushels remained?

6. $7\frac{2}{3}$ yards of silk were cut from a piece containing $18\frac{2}{3}$ yards. How many yards remained?

7. A dressmaker used $5\frac{1}{2}$ yards of cloth for a skirt and $2\frac{1}{2}$ yards for a waist. How many yards did she use for both?

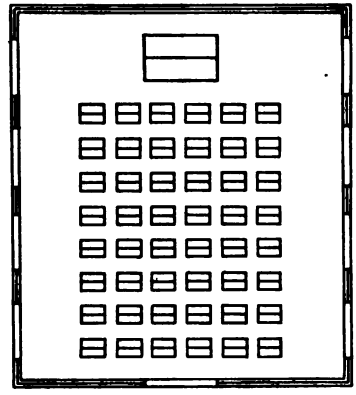
8. Mr. Miller owned $30\frac{1}{2}$ acres of land. He kept $24\frac{1}{2}$ acres and sold the remainder at $\$48$ an acre. How much did he receive for the part sold?

9. Find the weight of 4 baskets of butter containing $35\frac{1}{2}$ lb., 18 lb., $22\frac{1}{2}$ lb., and 16 lb., respectively.

10. Harry made $8\frac{1}{2}$ gallons of lemonade and sold 7 gallons. How much was unsold?

11. Find the distance around a room that is $18\frac{1}{2}$ ft. long and 16 ft. wide.

PRACTICAL PROBLEMS



1. This schoolroom is 32 feet long and 28 feet wide. What is the distance around it?

2. The glass in each window cost $2.50. How much was paid for all the glass?

3. Each desk cost $3.25. Find the cost of the desks in each long row.

4. Find the value of the desks in the 6 rows.

5. The attendance for the first 8 school days was as follows: 36, 43, 42, 43, 37, 41, 43, 43, respectively. What was the average attendance?

NOTE. — To find the average add the eight numbers and divide the sum by 8.

6. Eight tons of coal were used during the term. How much was paid for the coal at $4.50 a ton?

7. What is the amount of the teacher's salary for 8 months, at $50 a month?

8. Find the entire cost of:

8 Advanced Geographies at $1.00 each.
8 Primary Geographies at $.45 each.
8 Grammars at $.50 each.
8 Language Lessons at $.35 each.
8 Readers at $.48 each.

PARTS OF NUMBERS

1. Find $\frac{2}{3}$ of 24.

$\frac{1}{3}$ of 24 is 8;
$\frac{2}{3}$ of $24 = 2 \times 8$, or 16.

How do we find $\frac{1}{3}$ of a number? $\frac{1}{4}$ of a number? $\frac{1}{8}$ of a number, etc.? $\frac{2}{3}$ of a number $= 2 \times \frac{1}{3}$ of the number. $\frac{3}{5}$ of a number $= 3 \times \frac{1}{5}$ of the number, etc.

Give rapidly:

2. $\frac{1}{2}$ of each number: 16, 24, 36, 44, 48, 50.
3. $\frac{1}{3}$ and $\frac{2}{3}$ of each number: 15, 18, 24, 36, 45.
4. $\frac{1}{4}$ and $\frac{3}{4}$ of each number: 16, 20, 28, 32, 48.
5. $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, and $\frac{4}{5}$ of each number: 20, 35, 45, 40, 80.

Find:

6. $\frac{1}{3}$ of 18	12. $\frac{2}{3}$ of 18	18. $\frac{2}{3}$ of 21	24. $\frac{2}{3}$ of 75
7. $\frac{1}{3}$ of 24	13. $\frac{3}{4}$ of 28	19. $\frac{3}{4}$ of 20	25. $\frac{2}{5}$ of 75
8. $\frac{1}{2}$ of 16	14. $\frac{1}{7}$ of 56	20. $\frac{2}{5}$ of 40	26. $\frac{3}{4}$ of 96
9. $\frac{1}{2}$ of 42	15. $\frac{1}{8}$ of 64	21. $\frac{7}{8}$ of 24	27. $\frac{1}{2}$ of 144
10. $\frac{2}{3}$ of 24	16. $\frac{1}{9}$ of 63	22. $\frac{2}{5}$ of 65	28. $\frac{3}{5}$ of 160
11. $\frac{3}{5}$ of 25	17. $\frac{2}{3}$ of 63	23. $\frac{5}{6}$ of 48	29. $\frac{4}{5}$ of 255

Find:

30. $\frac{2}{3}$ of \$24	35. $\frac{3}{4}$ of 12 lb.	40. $\frac{1}{2}$ of \$8.20
31. $\frac{3}{4}$ of \$16	36. $\frac{2}{3}$ of 9 ft.	41. $\frac{1}{3}$ of \$12.60
32. $\frac{1}{2}$ of \$50	37. $\frac{1}{3}$ of 12 yd.	42. $\frac{1}{4}$ of \$20.40
33. $\frac{2}{3}$ of \$18	38. $\frac{3}{4}$ of 16 gal.	43. $\frac{1}{3}$ of \$15.90
34. $\frac{3}{4}$ of \$20	39. $\frac{3}{4}$ of 8 bu.	44. $\frac{1}{4}$ of \$24.20

MULTIPLICATION

How many are:

1. 704×3096	6. 309×4039	11. $803 \times \$40.70$
2. 809×9409	7. 907×7008	12. $709 \times \$75.25$
3. 609×7320	8. 408×6007	13. $304 \times \$68.07$
4. 507×8060	9. 502×9103	14. $508 \times \$70.95$
5. 608×3724	10. 903×7030	15. $806 \times \$48.57$

Multiply:

16. 8945 by 643	26. 6785 by 904	36. 5078 by 206
17. 3089 by 136	27. 7856 by 685	37. 9067 by 508
18. 4506 by 275	28. 9786 by 607	38. 8906 by 379
19. 3875 by 609	29. 7869 by 783	39. 6709 by 806
20. 5783 by 382	30. 6778 by 579	40. 6076 by 927
21. 3296 by 907	31. 9868 by 632	41. 8405 by 403
22. 7395 by 834	32. 5846 by 597	42. 6035 by 876
23. 3837 by 958	33. 6484 by 460	43. 8708 by 804
24. 6574 by 687	34. 9676 by 329	44. 7083 by 705
25. 8936 by 706	35. 6798 by 376	45. 5067 by 770

46. Mr. Watson had 2475 boxes of soap. Each contained 175 cakes. How many cakes of soap had he?

47. A factory averages 2485 articles for 310 days of the year. What is the entire number made?

48. Find the cost of 246 hats at \$1.75 each.

49. A suit factory manufactured 3685 suits. At \$28.50 each, how much was received for them?

MULTIPLICATION

The sign @ followed by a price means "at" so much a unit. Thus, "3 lb. steak @ 15¢" means "3 lb. steak *at* 15¢ *a pound;*" "6 doz. buttons @ 20¢" means "6 doz. buttons *at* 20¢ *a dozen.*"

Find the cost of:

1. 3 lb. steak @ 15¢.
2. 6 bu. potatoes @ 48¢.
3. 5 sheep @ $4.75.
4. 6 bureaus @ $7.75.
5. 6 cows @ $48.
6. 6 rugs @ $4.75.
7. 6 lb. sugar @ 4¢.
8. 5 cans tomatoes @ 12¢.
9. 6 hats @ $1.25.
10. 5 books @ $1.75.
11. 6 lamps @ $1.33.
12. 6 wagons @ $85.

13. Multiply 16 by $2\frac{1}{2}$.

$$\begin{array}{r} 16 \\ 2\frac{1}{2} \\ \hline \end{array}$$

$\frac{1}{2}$ of 16 = 8
2 × 16 = 32
$2\frac{1}{2}$ × 16 = 40

$2\frac{1}{2}$ times 16 means that $\frac{1}{2}$ of 16 is to be added to 2 times 16.

Short Form

$$\begin{array}{r} 16 \\ 2\frac{1}{2} \\ \hline 8 \\ 32 \\ \hline 40 \end{array}$$

Find the cost of:

14. $8\frac{1}{2}$ gal. oil @ 12¢.
15. $6\frac{1}{4}$ bu. potatoes @ 80¢.
16. $8\frac{1}{4}$ yd. silk @ $1.20.
17. $7\frac{1}{2}$ gal. milk @ 16¢.
18. $6\frac{1}{4}$ doz. bananas @ 24¢.
19. $6\frac{1}{2}$ doz. buttons @ 54¢.
20. $7\frac{1}{2}$ doz. buttons @ 36¢.
21. $9\frac{1}{3}$ hours' work @ 18¢.
22. $8\frac{1}{4}$ pounds butter @ 32¢.
23. $6\frac{1}{2}$ pounds meat @ 16¢.
24. $7\frac{1}{4}$ pk. peaches @ 40¢.
25. $3\frac{1}{8}$ yd. muslin @ 16¢.

REVIEW OF DIVISION

Divide and test:

1. 84563 by 224
2. 45675 by 125
3. 46752 by 236
4. 84252 by 342
5. 78654 by 375
6. 98740 by 425
7. 97601 by 438
8. 98700 by 508
9. 80070 by 710
10. 81704 by 508
11. 99999 by 999
12. 50321 by 637
13. 95846 by 675
14. 37846 by 332
15. 92846 by 124
16. 45983 by 475
17. 32841 by 243
18. 92384 by 752
19. 66008 by 300
20. 15899 by 122
21. 77443 by 224
22. 59823 by 525
23. 78912 by 640
24. 93408 by 825

Find quotients and test:

25. $136425 \div 405$
26. $246840 \div 476$
27. $332468 \div 332$
28. $948562 \div 450$
29. $476352 \div 221$
30. $789324 \div 552$
31. $569239 \div 334$
32. $159909 \div 115$
33. $550550 \div 155$
34. $889034 \div 324$
35. $604325 \div 304$
36. $708546 \div 222$
37. $125745 \div 125$
38. $985432 \div 112$
39. $756342 \div 102$
40. $354725 \div 256$
41. $498075 \div 401$
42. $987260 \div 200$
43. $800745 \div 310$
44. $584972 \div 226$

SHORT METHODS IN DIVISION

1. Divide 7284 by 600.

$$6\not{0}\not{0})7284$$
$$12\tfrac{84}{600}$$

2. 9754 by 800.

$$8\not{0}\not{0})9754$$
$$12\tfrac{154}{800}.$$

3. Divide 48525 by 2300.

$$23\not{0}\not{0})48525$$
$$21\tfrac{225}{2300}$$
$$46$$
$$25$$
$$23$$
$$225 \text{ Rem.}$$

Cutting off the naughts in the divisor and 2 figures in the dividend divides both by 100, with a remainder of 25 in the dividend. 485 hundreds divided by 23 equals 21, with a remainder of 2 hundreds. Bring down the first remainder of 25 to form the complete remainder, 225.

Divide:

4. 76856 by 2200
5. 86040 by 3100
6. 86075 by 2500
7. 40673 by 3200
8. 87604 by 2300
9. 68025 by 4200
10. 56078 by 2400
11. 70642 by 4100
12. 47630 by 5100
13. 85763 by 1300

Find quotients:

14. 869325 ÷ 463
15. 739186 ÷ 956
16. 293869 ÷ 409
17. 891382 ÷ 786
18. 632007 ÷ 817
19. 283756 ÷ 268
20. 873700 ÷ 945
21. 586138 ÷ 715
22. 938004 ÷ 807
23. 139287 ÷ 800

MULTIPLICATION AND DIVISION

Multiply and divide by 8; by 9:

	a	*b*	*c*	*d*	*e*
1.	2465	2469	2816	6824	6178
2.	7381	8397	9375	4836	8293

Find:

3. $\frac{3}{7}$ of 4683 sheep
4. $\frac{3}{8}$ of 9376 horses
5. $\frac{4}{9}$ of 7353 bu.
6. $\frac{2}{7}$ of 4347 gal.
7. $\frac{3}{8}$ of 3600
8. $\frac{2}{9}$ of 7479

How much change shall I receive from \$10 for the following? Name the coins in each purchase.

9. $2\frac{1}{2}$ yd. silk @ 60¢
10. $7\frac{1}{3}$ doz. eggs @ 30¢
11. 24 lb. butter @ \$$\frac{1}{4}$
12. $3\frac{1}{2}$ bu. plums @ \$2.50

MARKET REPORT

Grapes, per crate,	\$2.75	Peaches, per basket,	\$1.35
Blackberries, per crate,	\$3.50	Pears, per bbl.,	\$3.75
Raspberries, per crate,	\$3.65	Apples, per bbl.,	\$3.50
Elderberries, per crate,	\$1.75	Cantaloupes, per box,	\$4.50

From the above report find the cost of:

13. 4 crates of blackberries.
14. 5 baskets of peaches.
15. 3 crates of grapes.
16. 3 crates of elderberries.
17. 4 bbl. of pears.
18. 2 boxes of cantaloupes.
19. 6 bbl. of apples.
20. 9 baskets of peaches.
21. 6 crates of blackberries.
22. 5 crates of elderberries.
23. 7 crates of raspberries.
24. 6 bbl. of pears.
25. 8 boxes of cantaloupes.
26. 8 baskets of peaches.

Make other problems from this or another Market Report.

PROBLEMS FOR BOYS

1. The drafting room is 24 feet wide and 28 feet long. What is the distance around the room?

2. There are 7 stands in the room. Each one cost $5.50. What was the cost of all?

3. Each stand requires a "T" square, angles, scale, erasers, thumb-tacks, etc. The instruments cost $28.35. What was the average cost of instruments for each stand?

4. The first class worked 40 minutes on Monday and Friday of each school week. How many minutes were spent by the class during 4 school weeks?

5. Each of 7 boys required a drafting board costing 50¢, ink, paper, pencils, etc., costing 25¢. What was the cost of these materials for the class?

6. The boys made two chairs valued at $8.75 each, 3 tabourettes at $3.25 each, and 4 book racks at $1.25 each. What was the value of all the articles?

PROBLEMS FOR GIRLS

1. It requires 4 yd. of material to make each of these girls an apron. How much will be required for the class of 7 girls?

2. At 8¢ a yd., how much will 7 aprons cost?

3. Out of $9\frac{1}{2}$ yd. of cambric, how many caps, requiring $\frac{1}{2}$ yd. each, can be made?

4. How many pupils can be supplied with rolling pins and pie pans out of $9, if each pin costs 20¢, and each pan 10¢?

5. At 18¢ a yard, find the cost of lawn for sleeve protectors for 7 girls, each sleeve requiring $\frac{1}{2}$ yd.

6. Miss Blew, the teacher, purchases the following: 7 flour cans @ 40¢, 7 cake pans @ 25¢, 7 sugar shakers @ 17¢. Find the amount of her purchases.

7. Entertaining the directors, this class uses 7 spring chickens @ 40¢, 2 pecks of potatoes @ 15¢, 1 head cabbage @ 8¢, 2 boxes tomatoes @ 10¢, $\frac{1}{2}$ lb. butter @ 32¢, 2 pt. cream @ 8¢, and $\frac{1}{2}$ gallon ice cream @ $1.50 per gallon. How much does the dinner cost them?

FRUIT AND GROCERY PROBLEMS

Market Report

Apples. Best, $2.25;
Fair grades, $1.50 per bbl.
Peaches. Good, $2.25;
Fancy, $2.50 per bu.
Pears. Best, $1.50 per bu.
Grapes. Niagara, 25¢ per 10-lb. basket.
Concords, 28¢ per 10-lb. basket.
Eggs. 18¢ per doz.
Butter. Creamery, 28¢ per lb.;
Dairy, 25¢ per lb.
Cheese. Full cream, 12½¢ per lb.
American, 15¢ per lb.
Potatoes. 50¢ per bu.
Sweet potatoes. Virginia, 80¢;
Jersey, $1.25 per bu.

From this market report find the cost of the following:

1. 8 bu. of fancy peaches.
2. 4½ lb. of butter, creamery.
3. 5½ bu. of potatoes.
4. 8 10-lb. baskets of Concord grapes.
5. 7 bbl. of apples, best quality.
6. 9 cases of eggs, 30 dozen each.
7. 8 10-lb. baskets of Niagara grapes.
8. 8½ bu. of sweet potatoes, Virginia.
9. 7 bu. of peaches, good.
10. 9 full cream cheese, 15 lb. each.
11. 7 10-lb. baskets of Concord grapes.
12. 9½ bu. of pears, best quality.
13. 8 bbl. of apples, fair grades.
14. 7 lb. of creamery butter and 32 lb. of dairy butter.
15. 8 bu. of fancy peaches, and 42 bu., good quality.
16. 8 10-lb. baskets of Concord grapes, and 6 10-lb. baskets of Niagara grapes.

PRACTICAL PROBLEMS

Find the cost of:

1. 28 pounds of raisins @ 15¢.
2. 46½ gallons of vinegar @ 24¢.
3. 196 pounds of sugar @ 6¢.
4. 48½ pounds of butter @ 28¢.
5. 64½ pounds of meat @ 16¢.
6. 85 dozen oranges @ 35¢.
7. 27 gallons of molasses @ 48¢.
8. 58¼ bushels of potatoes @ 60¢.
9. 25 dozen eggs @ 23¢.
10. 54 barrels of flour @ $5.25.
11. 27 barrels of apples @ $2.35.
12. 34 tons of coal @ $6.75.
13. 148½ pounds of tea @ 56¢.
14. 144 dozen eggs @ 26¢.
15. 48 yards of cloth @ 87¢.
16. 36½ tons of hay @ $16.70.

17. The frontage on a city street is 176 feet. How much is it worth at $65 a front foot?

18. A grocer sold 18 firkins of butter, each containing 56 pounds, at 24¢ a pound. How much did he receive for the butter?

19. A boy works 8 hours a day. How many hours does he work in 28¼ days?

DIVISION OF DOLLARS AND CENTS

Find the products; test and read answers:

	a	*b*	*c*
1.	$4 \times \$2.75$	$7 \times \$82.93$	$8 \times \$93.15$
2.	$5 \times \$3.86$	$8 \times \$46.25$	$9 \times \$73.86$
3.	$6 \times \$7.27$	$9 \times \$73.87$	$7 \times \$49.25$

4. Divide \$6.15 by 3.

$$3)\underline{\$6.15}$$
$$\$2.05$$

Divide \$6.15 by 3, placing a *decimal point* under the decimal point in the dividend. Write the dollar sign before the number of dollars in the quotient.

Find the quotients; read and test answers:

	a	*b*	*c*
5.	$\$4.75 \div 2$	$\$6.75 \div 4$	$\$29.34 \div 9$
6.	$\$2.08 \div 2$	$\$8.22 \div 6$	$\$46.72 \div 8$
7.	$\$9.27 \div 3$	$\$9.05 \div 5$	$\$71.05 \div 7$

Find:

8.	$\frac{1}{3}$ of \$27.15	$\frac{1}{4}$ of \$16.64	$\frac{1}{7}$ of \$39.34
9.	$\frac{1}{2}$ of \$18.24	$\frac{1}{5}$ of \$26.70	$\frac{1}{8}$ of \$97.68
10.	$\frac{1}{4}$ of \$20.48	$\frac{1}{6}$ of \$38.40	$\frac{1}{9}$ of \$27.36

Perform the operation indicated:

11.	$\$273.84 \div 6$	$\$263.75 \div 8$	$\$375.42 \div 6$
12.	$\$936.25 \times 5$	$\$423.96 \times 9$	$\$495.67 \div 7$
13.	$\$475.83 \times 6$	$\$928.14 \div 6$	$\$321.21 \div 9$
14.	$\$721.98 \div 9$	$\$743.68 \div 7$	$\$563.94 \times 8$
15.	$\$435.72 \div 8$	$\$269.19 \div 9$	$\$732.75 \times 6$

PRACTICAL PROBLEMS

1. At \$.25 each, how many books can you buy for \$6.25?

\$6.25 = 625¢ \$.25 = 25¢

25 No. of books.

Cost of 1 book 25¢) 625¢, money spent.

50

125

125

2. At 16 cents each, how many belts can be bought for \$4.80?

3. Mary paid 24 cents a pound for butter. The amount of her bill was \$3.12. How many pounds did she buy?

4. How many gallons equal 652 quarts?

5. I bought silk at 75 cents a yard and paid \$13.50. How many yards did I buy?

6. In how many months will a man save \$1120, if he saves \$32 a month? in how many years?

7. How many bars of iron, weighing 56 lb. each, are equal in weight to a bar weighing 18200 lb.?

8. A man sold land for \$45 an acre, receiving \$7200 for it. How many acres did he sell?

9. An orchard contains 4032 trees, planted in 32 rows. How many trees are there in a row?

10. A farm of 174 acres was sold for \$12876. What was the selling price per acre?

SIGHT WORK IN MULTIPLICATION AND DIVISION

These problems should be worked by writing the answers directly, without placing the multiplier under the multiplicand.

Find the cost of:

1. 3 houses @ $2500.
2. 750 bu. coal @ 8¢.
3. 60 hats @ $1.25.
4. 1 doz. chairs @ $2.50.
5. 25 suits @ $10.
6. 6 gal. oil @ $.60.
7. 8 gal. varnish @ $1.25.
8. 150 yd. cloth @ $.30.
9. 12 lb. butter @ 25¢.
10. 25 doz. eggs @ 25¢.
11. 11 doz. lemons @ 30¢.
12. 15 pails of lard @ 40¢.
13. 3 gal. maple sirup @ $1.25.
14. 3 hams @ $2.75.

Give products at sight:

15. $4 \times 30 =$
16. $10 \times 10 =$
17. $2 \times 25 =$
18. $5 \times 50 =$
19. $6 \times 60 =$
20. $8 \times 90 =$
21. $12 \times 50 =$
22. $11 \times 30 =$
23. $9 \times 25 =$
24. $10 \times 35 =$
25. $12 \times 12 =$
26. $12 \times 40 =$
27. $12 \times 15 =$
28. $12 \times 45 =$

Find the cost of 1 when:

29. 9 bbl. flour cost $54.
30. 12 doz. oranges cost $3.
31. 8 coats cost $48.
32. 4 sheep cost $22.
33. 15 lb. butter cost $3.

Give quotients at sight:

34. $360 \div 9 =$
35. $328 \div 8 =$
36. $455 \div 7 =$
37. $156 \div 12 =$
38. $121 \div 11 =$

REVIEW

Find the cost of:

1. 9 rings @ $3
2. 12 cows @ $35
3. 10 hats @ $3.65
4. 10 rugs @ $1.50
5. 3 wagons @ $85
6. 9 plates @ $1.75
7. 10 knives @ $.75
8. 10 vases @ $2.39
9. 10 horses @ $95
10. 11 books @ $2.25
11. 11 sheep @ $4.75
12. 10 chairs @ $5.25
13. 6 chickens @ 75¢
14. 12 pictures @ $4.50

Find the cost of 1, when:

15. 12 lamps cost $51
16. 4 cases cost $32.48
17. 10 sleds cost $19.50
18. 10 sheep cost $45.00
19. 11 desks cost $35.75
20. 8 trunks cost $57.60
21. 10 clocks cost $48.50
22. 5 hats cost $15
23. 12 hats cost $27
24. 8 lb. rice cost 96¢
25. 3 clocks cost $9.75
26. 9 books cost $11.25
27. 5 chairs cost $15.45
28. 9 lb. nuts cost $2.25
29. 8 bu. coal cost $1.20
30. 10 satchels cost $35.50
31. 12 yd. lace cost 48¢
32. 11 lb. steak cost $1.98
33. 6 gal. vinegar cost 72¢
34. 12 bu. potatoes cost $9
35. 12 pk. tomatoes cost $3
36. 10 toy engines cost $35
37. 5 lb. steak cost $1.10
38. 8 qt. cream cost $1.60
39. 4 bu. cherries cost $15
40. 10 yd. silk cost $17.50
41. 10 pt. cream cost $1.10
42. 11 lb. butter cost $2.20
43. 3 pairs shoes cost $9.75
44. 12 collars cost $2.40

REVIEW

Find the cost of:

1. $13\frac{1}{2}$ lb. of butter at 25¢ a lb.
2. 64 suits at $\$8\frac{1}{4}$ each.
3. 32 pairs of shoes at \$2 a pair.
4. 400 lb. of sugar at 4¢ a pound.
5. 36 overcoats at \$13.25 each.
6. 3000 envelopes at \$12 a thousand.
7. 172 yards of cloth at 87¢ a yard.
8. 2500 lb. of coffee at 20¢ a pound.
9. 128 hogs at $\$16\frac{1}{4}$ each.
10. 37 hats at \$2.25 each.
11. $45\frac{1}{2}$ yards of silk at 80¢ a yard.
12. 1 gross pencils at 60¢ a dozen.
13. 32 cows at \$32 each.
14. 125 tons of hay at \$14.75 a ton.
15. 72 bbl. of flour at \$5.25 a barrel.
16. 14 bolts of ribbon at 75¢ a bolt.
17. 78 bu. of wheat at 87¢ a bushel.
18. $47\frac{1}{2}$ bu. of oats at 40¢ a bushel.
19. 25 bu. of corn at 50¢ a bushel.
20. 25 lb. of meat at 25¢ a pound.
21. $2\frac{1}{2}$ doz. pairs of gloves at \$1 a pair.
22. $36\frac{1}{2}$ yd. of cloth at 18¢ a yard.
23. 2 gross penholders at 50¢ a dozen.

Add:

24. \$463.75
695.42
1937.86
947.75
678.93

25. \$6937.85
596.27
8346.39
326.42
2186.75
495.38

26. \$9612.73
693.85
2928.46
478.74
8569.93
195.84

27. \$3762.95
661.43
99.87
875.67
989.86
4987.19

DIVISION AND PARTITION

Division is the process of finding how many times one number contains another, or of separating a number into equal parts.

1. How many times is \$ 3 contained in \$ 15 ?

This problem gives the *size* of the equal parts (\$ 3) into which the dividend (\$ 15) is to be divided, and asks for the *number* of equal parts. \$ 15 ÷ \$ 3 = 5, the *number* of equal parts.

2. What is the quotient of \$15 divided by 3 ?

This problem gives the *number* of equal parts (3) into which the dividend (\$ 15) is to be divided, and asks for the *size* of each part. $\frac{1}{3}$ of \$ 15 = \$ 5, the *size* of each part. This kind of division is called **partition.**

First state whether each problem calls for the *number* of equal parts or the *size* of each part, and then give answers :

3. 144 in. ÷ 12 in.
4. 125 yd. ÷ 5
5. \$ 132 ÷ \$ 11
6. 150 ft. ÷ 10
7. 192 bu. ÷ 16 bu.
8. 108 in. ÷ 9
9. $\frac{1}{10}$ of \$ 250
10. $\frac{1}{8}$ of 128 da.

11. At 45 ¢ a bushel, how many bushels of corn will sell for \$ 17.55 ?

12 If 28 Stanhope buggies are sold for \$ 2912, what is the average price ?

13. If a train runs 1036 miles in 37 hours, how far will it run in one hour ?

PROBLEMS FROM PRICE LISTS

MARKET REPORT

Potatoes, 75¢ per bu.	Corn, 45¢ per bu.
Beans, $1.25 per bu.	Baked beans, 95¢ per doz. cans.
Butter, Print, 33¢ per lb.	Celery, 10¢ per bunch.
Dairy, 25¢ per lb.	Eggplant, 75¢ per doz.
Sugar, 100 lb. bag, $5.50.	Watercress, 40¢ per doz.
Flour, per bbl., $5.80.	Blackberries, per crate, $3.20.

From the market report find the cost of each of the following:

1. 7 bu. potatoes.
2. 15 lb. print butter.
3. 30 bunches celery.
4. 25 doz. watercress.
5. 5 bu. beans.
6. 12 lb. dairy butter.
7. 8 bu. corn.
8. 10 bags sugar.
9. 25 bbl. flour.
10. 2 doz. cans baked beans.
11. 7 doz. eggplants.
12. 3 crates blackberries.

At $12\frac{1}{2}$¢ each find the cost of:

13. 72 lb. meat.
14. 144 books.
15. 64 vases.
16. 168 cups.
17. 256 yd. lawn.
18. 176 cards buttons.
19. 272 pk. potatoes.
20. 128 baskets tomatoes.
21. 96 watermelons.
22. 152 yd. ribbon.

23. If 24 barrels of oil cost $44.40, what is the price of 1 barrel?

24. James bought 10 lb. of sugar at 6 cents a pound; 4 lb. of butter at 20 cents a pound; 6 lemons at 3 cents apiece; and two 8-cent loaves of bread. How much was his bill?

FARM PROBLEMS

1. A farmer has 28 cows in three fields. If there are 12 in the first, and 9 in the second, how many cows are there in the third field?

2. The farmer values his cows at an average of $ 35 each. What is the value of all?

3. The fields over which they graze contain 24 acres, 18 acres, and 14 acres. How much grazing land is there, and what is the value of this land at $ $35\frac{1}{2}$ an acre?

4. If the farmer receives 21560 gallons of milk a year, how much is it worth at 12 cents a gallon?

5. His Jersey cow yields 350 lb. of butter a year, which he sells at 28 cents a pound. How much does he receive for it?

6. He sold 5 of the cows at an average price of $ 48.50. How much did he receive for them?

7. He keeps 2 men at $ $22\frac{1}{2}$ a month each, to work on the farm. How much does the labor for the year cost?

8. He sold 14 calves for $ 98. How much did he receive, on an average, for each?

9. His grocery bill averaged $ $36\frac{1}{4}$ per month. Find his bill for the year.

10. He purchased 2 horses, one at $ 125, and one at $ 150; and 2 wagons at $ 85 each. Repairs on the farm cost $ 87.50. Find the amount paid.

11. He bought $1\frac{1}{2}$ doz. milk cans at $1.20 each. How much did they cost?

FRACTIONAL PARTS OF A DOLLAR

$\$.50 = \frac{1}{2}$ of $\$1.00$	$\$.10 = \frac{1}{10}$ of $\$1.00$
$\$.25 = \frac{1}{4}$ of $\$1.00$	$\$.75 = \frac{3}{4}$ of $\$1.00$

Give at sight by the shortest method the cost of:

1. 6 bushels of apples at $.50 a bushel.

HINT. — $6 \times \$\frac{1}{2} = \$\frac{6}{2} = \$3$.

2. 8 gallons of vinegar at $.25 a gallon.
3. 8 yards of silk at $.50 a yard.
4. 8 pounds of meat at $.25 a pound.
5. 10 dozen eggs at $.25 a dozen.
6. 9 yards of muslin at $.10 a yard.
7. 6 pecks of pairs at $.25 a peck.
8. 12 pictures at $.75 each.
9. 10 yards of lawn at $.10 a yard.
10. 6 gallons of vinegar at $.50 a gallon.
11. 8 gallons of oil at $.25 a gallon.
12. 12 dozen oranges at $.25 a dozen.
13. 6 bushels of apples at $.50 a bushel.
14. 16 pounds of rice at $.10 a pound.
15. 10 pecks of peaches at $.25 a peck.
16. 8 gallons of milk at $.25 a gallon.

MEASURES OF LENGTH OR DISTANCE

Change:

1. 60 ft. to yd.
2. 28 rd. to ft.
3. 16 ft. to in.
4. 48 in. to ft.
5. 320 rd. to ft.
6. 1760 yd. to ft.
7. 5 ft. to in.
8. 120 in. to ft.
9. 72 ft. to yd.
10. 420 in. to ft.
11. 1250 yd. to ft.
12. 120 rd. to ft.

13. How many feet of fence are required for a garden in the form of an oblong 26 yards long and 12 yards wide?

14. James lives 180 rods from the schoolhouse. How many feet does he travel in going to and coming from school each day?

15. A boy travels 135 yards each day in carrying the mail. How many yards does he travel in 6 days? How much less than a mile does he travel?

16. Find the number of feet in 8 miles.

17. How many feet are there in 5 miles and 675 feet?

18. Change 2880 rods to miles.

19. John lives half a mile from the school. What is the distance in feet? What is the distance in rods?

20. How many feet are there in $1\frac{1}{2}$ miles?

21. Change 4 rods to feet; to yards.

MEASURES OF SURFACE

Find the area in square inches of:

1. An oblong 6 in. by 4 in.
2. A square 7 in. on each side.
3. A page 8 in. by 5 in.
4. A slate 10 in. by 12 in.
5. An 8-in. square.
6. A 12-in. square.
7. A 9-in. square.
8. A 10-in. square.

9. Draw a figure to represent an oblong 5 in. long and 3 in. wide. Find its area. Find the distance around the oblong.

What is the distance around a figure called?

10. Find the perimeter, in inches, of each figure described in problems 1 to 9.

Represent the following figures by a scale of 1 inch to the foot, and find the area and the perimeter:

11. A 6-ft. square.
12. A rug 9 ft. by 4 ft.
13. A wall 9 ft. by 6 ft.
14. A table 6 ft. by 5 ft.

Find the area and the perimeter. Represent on a scale of 1 inch to a yard:

15. A schoolroom 10 yd. long and 8 yd. wide.
16. A hall 15 yd. long and 3 yd. wide.
17. A sidewalk 12 yd. long and 2 yd. wide.
18. Matting for a room 5 yd. long and 4 yd. wide.
19. Measure, in even yards, the length and width of your schoolroom floor, and draw the figure on a scale of 1 in. to the yard; 1 in. to the foot.

REVIEW OF MEASURES

1. Give the table used for measuring liquids.

2. Name some articles sold by liquid measure.

3. Give the table used for measuring dry and bulky articles.

4. Name the most common articles sold by the peck or the bushel.

5. Give the table of measures of weight.

6. Name the most common articles sold by the ounce; the pound; the ton.

7. Give the table used for measuring time.

8. Give the table of measures of length. What measures are used for measuring short distances? long distances?

9. Give the table of measures of surface.

10. Write the names of the measures on blackboard or paper, and write each of the following under its proper measure: oil, cheese, oats, hay, beans, potatoes, coal, cloth, molasses, sugar, rice, the surface of the blackboard, the width of the room, the length of the blackboard.

11. Draw a diagram to show the number of square inches in an oblong 4 in. by 3 in.

12. Show by diagram that 9 square feet equal one square yard.

13. Show by a diagram on a scale of $\frac{1}{12}$ inch to the foot that 144 square inches equal one square foot.

REVIEW OF MEASURES

Change:

1. 16 pt. to gallons.
2. 24 bu. to pecks.
3. 3 sq. ft. to sq. inches.
4. 17 yd. to feet.
5. 120 ft. to inches.
6. 50 lb. to ounces.
7. 6 T. to pounds.
8. 74 pk. to bushels.
9. 3750 yd. to feet.
10. 3 in. to feet.
11. 6 mi. to rods.
12. 360 ft. to yards.
13. 4860 in. to feet.
14. 6966 sq. ft. to sq. yd.

15. How many dozen oranges, and how many over are there in a box containing 143 oranges? 165 oranges? 195 oranges?

16. Find the number of square inches in a flower bed 4 feet long and 3 feet wide.

17. The slate blackboard is 3 feet wide and 26 feet long. Find its surface in square feet.

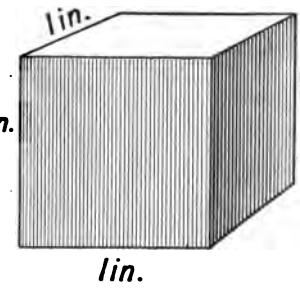
18. A fruit dealer buys chestnuts at $3 per bushel, and sells them at $.10 per quart. Find his profit.

19. The schoolroom floor is 36 feet long and 28 feet wide. Find the number of square feet in the floor; in the ceiling.

20. James walks to school every morning, 600 yards. How many feet does he walk each day, in going to and coming from school?

21. A huckster sells 10 bushel-crates of peaches at 20 cents per quarter peck. Find the amount from the sale of the peaches.

VOLUMES



This block or solid is 1 in. long, 1 in. wide, and 1 in. high.

It has six equal sides called *faces*, and each face contains **1 square inch.**

A block or solid with 6 *equal square faces* is called a **cube.**

A cube whose faces are each a square inch contains a **cubic inch,** written cu. in.

To the Teacher. — Secure 50 1-in. cubical blocks. Have pupils build solids, and count the number of cubic inches in each solid; the number of square inches on each face.

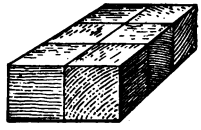


Fig. 1.

1. Build figure 1 with inch cubes. How many cubes does it take?

2. Build figure 2 with inch cubes. How many layers of blocks are there? How many in each layer?

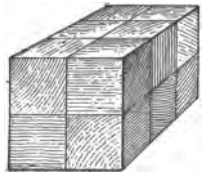


Fig. 2.

In 1 layer there are 6 cu. **in.**

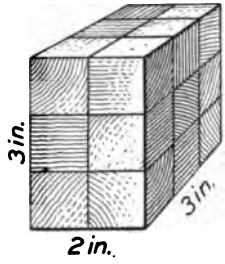
In 2 layers there are 2×6 **cu. in.** = 12 cu. in.

The number of cubic inches or cubic feet in a solid is called the **volume** or **contents** of the solid.

3. Build 12 blocks into a solid that has 4 blocks in each layer. How many layers are there?

VOLUME

1. Build a figure 2 in. by 3 in. by 3 in. with inch cubes. How many does it take? How many layers? How many are there in each layer? 3×6 cu. in. $= 18$ cu. in. in the solid.



2. Build 10 other solids with blocks, and ascertain the number of blocks in each.

3. A brick is 8 in. long, 4 in. wide, and 2 in. thick. Find its volume in cubic inches.

4. A piece of wood is 3 in. wide, 3 in. thick, and 4 in. long. How many cubic inches does it contain?

5. A boy's book is 4 in. wide, 1 in. thick, and 6 in. long. Find the number of cubic inches in the book.

6. Mrs. Adams has a flower box that is 24 in. long, 8 in. wide, and 6 in. deep, inside measurement. How many cubic inches of soil will it take to fill it?

7. A square stick is 3 in. wide, 3 in. thick, and 12 in. long. How many cubic inches are there in the stick?

8. The inside of a box is 5 in. long, 4 in. wide, and 3 in. high. How many inch cubes can be built into it?

9. A box is 10 in. long, 6 in. wide, and 5 in. high, inside measurement. How many cubic inches of sand will it contain?

DRILL

1. Begin with 5 and count by 5's to 60.
2. Begin with 4 and count by 4's to 48.
3. Begin with 8 and count by 8's to 94.
4. Begin with 7 and count by 7's to 84.
5. Begin with 6 and count by 6's to 72.
6. Begin with 9 and count by 9's to 126.
7. Begin with 1 and count by 9's to 118.
8. Begin with 10 and count by 10's to 120.
9. Begin with 11 and count by 11's to 132.
10. Begin with 12 and count by 12's to 144.

Add from left to right:

11. $42+74+39=$
12. $36+93+61=$
13. $27+81+87=$
14. $49+64+49=$
15. $38+72+86=$
16. $24+32+65=$
17. $39+86+92=$
18. $94+39+19=$
19. $28+76+85=$
20. $63+15+84=$

21. $\$42.35+\$24.63+\$36.74+\$82.95=$
22. $\$18.69+\$32.78+\$6.27+\$2.39=$
23. $\$2.41+\$41.65+\$.96+\$49.85=$
24. $\$36.74+\$59.83+\$18.49+\$13.74=$
25. $\$83.89+\$43.62+\$9.37+\$26.48=$
26. $\$57.35+\$75.15+\$72.26+\$275.25=$
27. $\$63.27+\$64.23+\$17.83+\$375.65=$

DRILL IN ADDITION

Add and test each example in one minute:

	a	*b*	*c*
1.	$2785.00	$5870.00	$475.00
	597.55	29.60	6000.00
	3000.00	587.25	459.06
	987.46	45.03	250.00
	6750.00	6540.20	4278.64
	5340.02	8750.00	5782.98
	9876.54	2346.59	8796.32
	3201.89	4567.83	4123.56
2.	$6004.50	$6550.00	$2987.35
	887.95	278.93	500.83
	504.06	8.10	6789.05
	2874.59	200.02	200.06
	850.00	7007.05	678.46
	2250.05	520.84	4586.23
	275.83	4265.63	2080.95
	7817.89	6005.80	2345.10
3.	$475.00	$1286.40	$7665.00
	6000.20	587.52	2050.50
	579.80	3873.20	2002.02
	1000.50	78.00	879.30
	457.39	759.06	698.09
	100.10	9300.00	5000.10
	4555.05	759.84	898.45
	7016.89	5234.18	4987.56

DRILL IN SUBTRACTION

Subtract and test 5 problems in 1 minute:

	a	*b*	*c*	*d*
1.	\$970.75	\$761.51	\$834.78	\$780.53
	387.68	137.49	209.99	489.85
2.	\$781.32	\$892.31	\$721.02	\$500.62
	467.64	704.92	430.07	189.84
3.	\$883.11	\$708.08	\$812.21	\$663.35
	579.64	597.79	721.26	487.95
4.	\$776.43	\$800.31	\$721.05	\$322.91
	81.79	98.89	89.64	285.89
5.	\$700.02	\$644.51	\$900.42	\$411.23
	127.76	394.82	289.65	309.88
6.	\$900.76	\$544.34	\$645.25	\$205.34
	398.97	497.69	528.46	108.38
7.	\$652.17	\$464.13	\$541.26	\$952.83
	489.79	389.84	409.68	503.24
8.	\$725.74	\$908.22	\$851.02	\$734.99
	637.75	127.75	389.92	456.82

DRILL IN MULTIPLICATION

Multiply and test each example in one minute:

1. 807×2045	8. 457×3087	15. 467×5934
2. 629×7708	9. 536×2946	16. 358×4572
3. 508×9430	10. 578×4352	17. 590×1742
4. 706×8075	11. 347×5238	18. 625×2834
5. 668×5638	12. 309×1378	19. 839×3456
6. 804×7652	13. 345×9203	20. 736×8754
7. 743×9536	14. 783×8736	21. 965×3420
22. 7892×435	29. 4759×803	36. 5678×908
23. 4569×301	30. 3642×745	37. 4329×754
24. 5238×763	31. 4758×546	38. 7534×842
25. 8741×650	32. 9026×493	39. 5692×734
26. 6329×485	33. 2984×367	40. 3587×605
27. 5736×984	34. 8534×703	41. 2479×573
28. 3492×807	35. 4736×750	42. 9357×486
43. $567 \times \$42.70$	50. $425 \times \$45.27$	57. $398 \times \$29.37$
44. $498 \times \$67.89$	51. $609 \times \$19.35$	58. $492 \times \$68.25$
45. $756 \times \$85.66$	52. $734 \times \$38.45$	59. $746 \times \$75.28$
46. $904 \times \$36.24$	53. $694 \times \$75.02$	60. $873 \times \$83.92$
47. $529 \times \$28.35$	54. $348 \times \$82.24$	61. $561 \times \$90.02$
48. $763 \times \$37.62$	55. $927 \times \$64.58$	62. $345 \times \$89.98$
49. $675 \times \$92.05$	56. $842 \times \$59.67$	63. $479 \times \$76.53$

DRILL IN DIVISION

Divide and test each example in one minute:

	a	*b*	*c*
1.	16434 by 64	28792 by 270	33467 by 890
2.	34643 by 28	75639 by 770	77304 by 860
3.	19603 by 83	66041 by 602	44384 by 280
4.	94432 by 62	77006 by 784	35690 by 761
5.	26341 by 74	60424 by 603	88762 by 892
6.	36236 by 37	90328 by 735	56044 by 883
7.	42624 by 41	76028 by 344	76428 by 444
8.	76342 by 36	84605 by 766	23688 by 985
9.	64283 by 24	16248 by 860	55624 by 666
10.	55022 by 82	74637 by 450	34632 by 555
11.	44302 by 74	68026 by 360	99240 by 461
12.	16792 by 81	84132 by 770	36002 by 880
13.	28644 by 73	70066 by 880	45676 by 390
14.	74305 by 37	50468 by 480	76324 by 302
15.	83265 by 87	66399 by 790	25321 by 440
16.	78325 by 75	24166 by 670	65436 by 784
17.	85679 by 41	12345 by 154	70504 by 621
18.	39410 by 52	67890 by 221	62131 by 905
19.	80624 by 63	89765 by 336	88776 by 860
20.	73102 by 74	43210 by 742	54340 by 408
21.	81103 by 85	34786 by 819	82107 by 329
22.	77777 by 96	57602 by 745	62434 by 752
23.	88888 by 72	80703 by 613	93785 by 607

PRACTICAL PROBLEMS

1. A man's salary is $950 per year. He pays $260 for board, $136 for clothing, and $115.75 for other expenses. How much has he left?

2. A grocer opened an account and deposited in bank during the week the following sums: $495.65, $305.75, $693.29, $75.80, $243.89, and $375.77. He then had a balance to his credit of $1200.15. How much had he withdrawn?

NOTE. First *estimate* the result mentally, as follows: $500 + $300 + $700 + $75 + $250 + $375 = $2200; $2200 − $1200 = $1000, approximate answer. Then find the exact result and compare the answers.

3. What is the value of 25 freight cars at $476 each?

NOTE. As 25 is $\frac{1}{4}$ of 100, multiply 476 by 100 by adding two naughts, and divide the product by 4.

4. A woman sold at a store 16 doz. eggs at 18¢ a dozen and $13\frac{1}{4}$ lb. butter at 28¢ a pound. How much did she receive?

5. A lady bought at a store:

8 lb. of coffee @ 28¢	24 lb. of sugar @ 5¢
$9\frac{1}{2}$ lb. of rice @ 8¢	8 cans of tomatoes @ 13¢

Find the amount of her purchases.

6. Find the cost of:

$27\frac{1}{2}$ lb. of cheese @ 18¢	25 bottles of ammonia @ 8¢
$14\frac{3}{4}$ lb. of lard @ 12¢	12 cans of peas @ 18¢

SOLVING PROBLEMS

Tell what is given in each problem, what is required, and the process by means of which each step of the problem may be solved.

When possible *estimate* results mentally and compare with exact answers to written work.

1. A butcher paid $1476 for 41 head of cattle. How much was that per head?

NOTE. *Estimate* the cost per head mentally as $1500 ÷ 40. Compare the result with the exact answer.

2. I bought 52 yards of cloth at 25¢ a yard, and 16 yards of matting at 28¢ a yard. Find the cost of both.

NOTE. *Estimate* the cost mentally as ¼ of $52 plus 15 × 30¢. Then work the example and compare answers.

3. At 38¢ a word, how many words can I cable from New York to Sweden for $3.04?

4. A lady sold 6 doz. eggs at 18 cents a dozen, and 8 lb. of butter at 27 cents a pound. How much did she receive for both?

5. A farmer bought 4 horses at $137 each, 7 cows at $27 each, and 38 sheep at $6.50 each. Find the cost of all.

6. What will be the cost of 108 lb. of ham at 16½ cents a pound, and 48 lb. of bacon at 18 cents a pound?

7. A man paid $165 for a carriage, and 3 times as much for a horse. How much did he pay for both?

SOLVING PROBLEMS

1. A dairyman has 137 cows in one herd and 47 less in another. How many cows has he?

137 No. cows in one herd.
47 No. less in 2d herd.
90 No. cows in 2d herd.

137 cows + 90 cows = 227 cows.

Study of Problem

1. What is given in this problem?
   a. The number of cows in one herd.
   b. The difference in the number in the two herds.
2. What is required in the problem?
   a. The number in the second herd.
   b. The number in both herds.
3. How can you find what is required from what is given?
   a. By subtracting the difference from the number in the first herd.
   b. By adding the number of cows in the two herds.

MENTAL ESTIMATE: $140 - 50 = 90$; $140 + 90 = 230$, approximate answer.

NOTE. The purpose of these studies is: (1) To train the pupil to understand the conditions of the problem. (2) To lead him to discover the logical steps in the solution of the problem. (3) To place emphasis upon the development of mathematical power.

2. A man has 267 sheep in one field and 88 less in another. How many sheep has he?

3. A merchant has $496 in the safe and $175.25 less in the bank. How much money has he in both places?

4. A man sold a farm for $7625 and gained $1685. How much would he have received for it if the gain had been $2675?

SOLVING PROBLEMS

1. A man earned each day in one week as follows: \$2.75, \$3.65, \$4.75, \$6.75, \$1.75, \$12.75. Find his average daily earnings.

\$ 2.75
3.65
4.75
6.75
1.75
12.75
6)\$ 32.40 in 6 days.
\$ 5.40 average each day.

Study of Problem

1. What is given in this problem?
2. What is required?
3. What is the first step in the solution? the second?
4. Why do you divide by 6 to find the average?
5. Show that the answer is correct.

2. Two men contribute equal amounts to buy a lot for \$875; to build a storeroom for \$4860; for furniture, \$520; and for goods to begin business, \$5785. How much does each pay?

3. A creamery received milk for six days as follows: 7640 gallons, 8675 gallons, 9634 gallons, 8432 gallons, 8763 gallons, and 8604 gallons. What were the average daily receipts?

4. If Helen received 85 in arithmetic, 79 in grammar, 89 in history, 92 in geography, 86 in physiology, and 85 in writing, what was her average in these studies?

5. The attendance at a school was 604 on Monday, 607 on Tuesday, 598 on Wednesday, 603 on Thursday, 598 on Friday. What was the average daily attendance for the week?

SOLVING PROBLEMS

1. 39 ladies' suits, each requiring 12 yards, were made from a lot of cloth containing 576 yards. How many yards were left?

12 yd. in 1 suit.
39 number of suits.
108
36
468 yd. in 39 suits.

576 yd. − 468 yd. = 108 yd.

Study of Problem

1. State this problem in another way.
2. What operation is employed in the first step in the solution? in the second?
3. Prove that the answer is correct.

2. A boy sold 16 books at 20 cents each, and 36 toys at 26 cents each. How much more did he receive for the toys than for the books?

3. Mr. Boyd's mail route is $23\frac{1}{4}$ miles, and Mr. Burton's is $17\frac{1}{4}$ miles. How much farther does Mr. Boyd travel in 84 days than Mr. Burton?

4. A school term is 180 days. If James attends $\frac{4}{5}$ of the term, how many days is he absent from school?

5. A bookkeeper receives $150 a month, and saves $68 a month. How much does he spend in a year?

6. Harry works $48\frac{1}{2}$ hours after school each month, at 12 cents per hour, and Henry $52\frac{1}{4}$ hours at 16 cents per hour. Find the difference in their wages.

7. A merchant buys 28 bbl. of sugar at $23 a barrel, and 36 bbl. at $24 a barrel. If he sells all for $1856, how much does he gain?

SOLVING PROBLEMS

1. A merchant paid $420.48 for carpet, and sold it for $569.40. If he gained 17¢ on each yard, how many yards did he buy?

$569.40 selling price of all.
420.48 cost price of all.
$148.92 gain of all.

Gain on
1 yd. $.17)$148.92 gain on all.
876 times, or yd.

Study of Problem

1. What do you mean by the term "cost"?
2. What do you mean by "selling price"? by "gain"?
3. How do you find the total gain?
4. Prove that the answer is correct.

2. I bought land for $1850, and sold it for $2294, thereby gaining $6 an acre. How many acres did I buy?

3. A drover bought cows for $1500, and sold them for $2250. If he gained $15 on each, how many did he buy?

4. Mr. Kinney paid $2640 for a city lot, and sold it for $4560. If he gained $24 a front foot, how many front feet did he sell?

5. The population of a town was 8675 in 1900, and 12,635 by a special census taken in 1913. What was the average yearly increase?

6. Mr. Beggs paid $288 rent last year. This year he pays $36 less. What is his rent per month?

7. A jeweler bought rings for $140 and sold them for $160. If he gained $.50 on each, how many did he buy?

SOLVING PROBLEMS

1. A laborer worked 16 days at \$1.60 a day, and with his earnings bought potatoes at 64¢ a bushel. How many bushels did he receive?

\$1.60 daily wages.
16 number of days worked.
960
160
\$25.60 total wages.

Price of 1 bu. \$.64) \$25.60 total wages.
40 times, or bushels.

Study of Problem

1. State this problem in another way.
2. How can we find the total amount earned?
3. What operation is involved in the first step of the solution? in the second step?
4. Prove that the answer is correct.

2. If 124 bags of coffee, each weighing 48 lb., were bought for \$729.12, what was the price per pound?

3. At 20¢ per hour how long will it take a laborer to earn \$80, working 8 hours per day?

4. If 96 bu. of corn sell for \$60.48, what is the value of 250 bushels at the same price?

5. In how many days does a man walk 960 miles if he averages 2 miles per hour for 8 hours each day?

6. If a dozen lemons cost \$.36, how much will 840 lemons cost?

7. If 25 bbl. of flour weigh 4900 lb., how much will 56 bbl. weigh?

8. If 23 carriages cost \$4025, how much are 84 such carriages worth?

TESTS

a

1. $6\frac{3}{4}$ ft. = —— in.?
2. $2340 \times 475 = ?$
3. $48360 \div 854 = ?$
4. $\$974.65 - \$688.78 = ?$
5. $\$.83 + \$6.92 + \$349 = ?$
6. $695 \times \$567.89 = ?$

b

1. $65\frac{3}{8} + 37\frac{1}{8} = ?$
2. $10\frac{1}{2} + ? = 19\frac{1}{2}?$
3. $69\frac{3}{4} - 30\frac{1}{4} = ?$
4. $3\frac{1}{4} + 21 + 25\frac{3}{4} = ?$
5. $10\frac{3}{8} - 5\frac{1}{8} = ?$
6. $3\frac{1}{4} + 8\frac{3}{4} + 5 = ?$

c

1. $376 \times 500 = ?$
2. $4500 \div 58 = ?$
3. $429 \times 200 = ?$
4. $3600 \div 600 = ?$
5. $894.50 \div 21 = ?$
6. $9\frac{1}{2}$ pk. = —— qt.
7. Find the cost of 3 gal. sirup at 35¢ a quart.

d

Find the cost of:

1. 6 tables @ \$ 7.65
2. $3\frac{1}{2}$ doz. buttons @ 40¢
3. $3\frac{1}{4}$ lb. butter @ 32¢
4. $4\frac{1}{8}$ yd. ribbon @ 16¢
5. 3 pt. milk at 8¢ a quart
6. 5 chairs @ \$ 1.35
7. $10\frac{1}{2}$ tons hay @ \$ 16.70

e

1. $\frac{1}{2} + \frac{1}{4} = ?$
2. $\frac{1}{4} + \frac{1}{8} = ?$
3. $\frac{1}{2} + \frac{1}{8} = ?$
4. $\frac{1}{2} - \frac{1}{4} = ?$
5. If I cut $\frac{1}{3}$ yd. lace from 1 yd., how much remains?

f

Find the cost of:

1. $2\frac{1}{3}$ doz. pens @ 24¢
2. $3\frac{1}{2}$ qt. milk @ 8¢
3. $5\frac{3}{4}$ lb. steak @ 28¢
4. $6\frac{3}{4}$ pk. peaches @ 48¢
5. $\$269.86 \div 75 = ?$

TABLES FOR REFERENCE

DRY MEASURE

2 pints (pt.) = 1 quart (qt.)
8 quarts = 1 peck (pk.)
4 pecks = 1 bushel (bu.)

LIQUID MEASURE

2 pints = 1 quart (qt.)
4 quarts = 1 gallon (gal.)

LONG MEASURE

12 inches (in.) = 1 foot (ft.)
3 feet = 1 yard (yd.)
$16\frac{1}{2}$ ft. = 1 rod (rd.)
$5\frac{1}{2}$ yd. = 1 rod (rd.)
320 rods = 1 mile (mi.)
5280 feet = 1 mile

SQUARE MEASURE

144 square inches = 1 square foot
9 square feet = 1 square yard

CUBIC MEASURE

1728 cubic inches = 1 cubic foot
27 cubic feet = 1 cubic yard

AVOIRDUPOIS WEIGHT

16 ounces (oz.) = 1 pound (lb.)
2000 pounds = 1 ton (T.)

TIME TABLE

60 seconds (sec.) = 1 minute (min.)
60 minutes = 1 hour (hr.)
24 hours = 1 day (da.)
7 days = 1 week (wk.)
52 weeks 1 day } = 1 common
365 days } = year (yr.)
366 days = 1 leap year
12 months (mo.) = 1 year

UNITED STATES MONEY

10 cents = 1 dime (d.)
10 dimes = 1 dollar ($)

COUNTING TABLE

12 = 1 dozen
12 dozen = 1 gross

ANSWERS

THIRD GRADE

Page 68. — **7.** First column : 68 apples ; 49 cakes ; 88 lemons. Second column : 29 boys ; 38 chairs ; 49 books.

Page 71. — **1.** $31. **2.** 34 heads. **3.** 52¢. **4.** 47¢. **5.** 32 min. **6.** 24 plants. **7.** 42¢. **8.** 21 pencils. **9.** 27 children.

Page 74. — **1.** 10 years old. **2.** 21¢. **3.** 61 more. **4.** 64 mi. **5.** 21 more cows. **6.** 31 pieces. **7.** 72 A. **8.** 21 miles farther. **10.** 31 children.

Page 77. — **1.** 22 qt. **2.** 63 sq. ft. **3.** $71. **4.** 32 cows. **5.** 55¢. **6.** 42¢. **7.** 31 qt. **8.** 63. **9.** 54. **10.** 84. **11.** 62. **12.** 57. **13.** $41.

Page 81. — **4.** *a.* 135 ; *b.* 225 ; *c.* 198 ; *d.* 222 ; *e.* 258. **5.** *a.* 405 ; *b.* 315 ; *c.* 648 ; *d.* 924 ; *e.* 621. **6.** *a.* 708¢ ; *b.* 927 yd. ; *c.* 711 in. ; *d.* 774 ft. ; *e* 567¢. **7.** *a.* 627 pt. ; *b.* 438 qt. ; *c.* 852¢ ; *d.* 501 in. ; *e.* 744 ft.

Page 82. — **1.** $88. **2.** 80¢. **3.** 28 yr. **4.** 28¢. **5.** 20¢. **6.** 48¢. **7.** 24¢. **8.** 22¢. **9.** 36 in. **10.** 63 mi. **11.** 48¢. **12.** 90¢. **13.** $72. **14.** 45¢.

Page 87. — **5.** *a.* 80 men ; *b.* 53 balls ; *c.* 242. **6.** *a.* 71 ft. ; *b.* 108 plants ; *c.* 309. **7.** *a.* 106 yd. ; *b.* 108 sheep ; *c.* 403. **8.** *a.* 305 books ; *b.* 401 in. ; *c.* 72. **9.** $40. **10.** 24 qt. **11.** 32 stamps. **12.** $44. **13.** 32¢.

Page 90. — **5.** 40 yd. **6.** 16 mi. **7** 32¢. **8.** 28 da. **9.** *a.* 260 ; *b.* 152 ; *c.* 92 ; *d.* 276 ; *e.* 192 ; *f.* 224. **10.** *a.* 372 ; *b.* 348 ; *c.* 296 ; *d.* 300 ; *e.* 344 ; *f.* 152. **11.** *a.* 328 ; *b.* 240 ; *c.* 420 ; *d.* 828 ; *e.* 760 ; *f.* 800. **12.** *a.* 936 ; *b.* 700 ; *c.* 832 ; *d.* 280 ; *e.* 396 ; *f.* 640.

Page 92. — **1.** 22 qt. **2.** 13 qt. **3.** $99. **4.** 42¢. **5.** $50. **6.** 62 oranges. **7.** $16. **8.** 77 chickens. **9.** $500. **10.** 40¢. **11.** 9 sq. in. **12.** 42 qt.

Page 93. — **1.** 4 dimes. **2.** 36 bulbs. **3.** 32 qt. **4.** $\frac{1}{4}$. **5.** $\frac{1}{8}$. **6.** 2 bows. **7.** 7 yd. **8.** 1. **9.** 15 greater. **10.** 36 in. ; 18 in. **11.** 73 bu. **12.** $1.44.

Page 97. — **2.** *a.* 50; *b.* 40; *c.* 50; *d.* 70; *e.* 70; *f.* 70; *g.* 80; **3.** *a.* 43; *b.* 53; *c.* 36; *d.* 55; *e.* 45; *f.* 43; *g.* 89. **4.** *a.* $59; *b.* $58; *c.* $89; *d.* $69; *e.* $87; *f.* $88; *g.* $66. **5.** *a.* 29 boys; *b.* 57 caps; *c.* 88 balls; *d.* 59¢; *e.* 68 ft. **6.** *a.* 45 girls; *b.* 97 men; *c.* 48 tops; *d.* 66 books.

Page 98. — **1.** *a.* 38; *b.* 46; *c.* 56; *d.* 53; *e.* 35; *f.* 47; *g.* 67. **2.** *a.* 57; *b.* 71; *c.* 58; *d.* 37; *e.* 67; *f.* 28; *g.* 97. **3.** *a.* 48; *b.* 28; *c.* 74; *d.* 78; *e.* 94; *f.* 87; *g.* 92. **4.** *a.* 85; *b.* 78; *c.* 76; *d.* 56; *e.* 57; *f.* 26; *g.* 68. **5.** *a.* 65¢; *b.* 84¢; *c.* 78¢; *d.* 86¢; *e.* 78¢; *f.* 58¢; *g.* 79¢. **6.** *a.* $77; *b.* $95; *c.* 99 qt.; *d.* 54 pt.; *e.* 59 in.; *f.* $77; *g.* $95. **7.** *a.* 99; *b.* 99; *c.* 89; *d.* 89; *e.* 98; *f.* 69; *g.* 98. **8.** *a.* 99; *b.* 78; *c.* 98; *d.* 86; *e.* 87; *f.* 77; *g.* 98.

Page 99. — **2.** *a.* 61; *b.* 71; *c.* 81; *d.* 90; *e.* 82; *f.* 62; *g.* 92. **3.** *a.* 82; *b.* 43; *c.* 39; *d.* 54; *e.* 55; *f.* 63; *g.* 84. **4.** *a.* 36; *b.* 52; *c.* 52; *d.* 44; *e.* 82; *f.* 75; *g.* 77. **5.** *a.* 71; *b.* 75; *c.* 56; *d.* 82; *e.* 77; *f.* 80; *g.* 94. **6.** *a.* 75; *b.* 93; *c.* 71; *d.* 39; *e.* 37; *f.* 73; *g.* 95.

Page 100. — **1.** $41. **2.** 91 bu. **3.** 72 papers. **4.** 80¢. **5.** $71. **6.** 93 potatoes. **7.** 70¢. **8.** 82¢. **9.** 51 min. **10.** 70 marbles.

Page 101. — **1.** *a.* 37; *b.* 40; *c.* 32; *d.* 31; *e.* 29; *f.* 36; *g.* 37; *h.* 38; *i.* 39; *j.* 32; *k.* 38; *l.* 43; *m.* 32; *n.* 31. **2.** *a.* 184; *b.* 198; *c.* 260; *d.* 156; *e.* 253; *f.* 145; *g.* 111. **3.** *a.* $150; *b.* $157; *c.* $233; *d.* $209; *e.* $109; *f.* $195; *g.* $264. **4.** *a.* $2.71; *b.* $2.10; *c.* $1.85; *d.* $1.66; *e.* $1.74; *f.* $3.16; *g.* $1.30. **5.** 28. **6.** 33.

Page 104. — **1.** 2 yr. **2.** 20¢. **3.** 24 more cards. **4.** 44 mi. **5.** 22 more cows. **6.** 42 pieces. **7.** 62 A. **8.** 13 mi. **10.** 12 children.

Page 106. — **2.** *a.* 36; *b.* 23; *c.* 45; *d.* 19; *e.* 36; *f.* 17; *g.* 37. **3.** *a.* 19; *b.* 54; *c.* 52; *d.* 19; *e.* 18; *f.* 28; *g.* 39. **4.** *a.* 29; *b.* 18; *c.* 25; *d.* 4; *e.* 18; *f.* 6; *g.* 16. **5.** *a.* 18; *b.* 14; *c.* 6; *d.* 7; *e.* 13; *f.* 15; *g.* 9. **6.** *a.* 18; *b.* 7; *c.* 8; *d.* 5; *e.* 47; *f.* 17; *g.* 19.

Page 107. — **1.** *a.* 8; *b.* 8; *c.* 13; *d.* 7; *e.* 9; *f.* 37; *g.* 9. **2.** *a.* $.28; *b.* $.63; *c.* $.49; *d.* $.53; *e.* $.46; *f.* $.16; *g.* $.33. **3.** *a.* 28¢; *b.* 16¢; *c.* $.05; *d.* 17¢; *e.* 7¢; *f.* $.23; *g.* 13¢. **4.** *a.* 28¢; *b.* $.14; *c.* $.52; *d.* 38¢; *e.* 4¢; *f.* $.47; *g.* 16¢. **5.** 42¢. **6.** 23 qt. **7.** 25 more quarts. **8.** 13 more girls. **9.** 15 more pages. **10.** 44 more flags.

Page 108. — **1.** $.81. **2.** $.09. **3.** $6.25. **4.** $.15. **5.** $.91. **6.** $81. **7.** $.47. **8.** $18. **9.** $.47. **10.** $.25. **11.** $.83.

Page 109. — **1.** 31; 34. **2.** 120 doz. **3.** 288 sq. in. **4.** 72 sq. in. **5.** 730 da. **6.** 120 mi. **7.** 63 baskets. **8.** 81 trees. **9.** 495 qt. **10.** $22. **11.** 240 min. **12.** XXVII; XXXI; XLII.

Page 111. — **6.** *a.* 1458; 1215; 972; 729; *b.* 3402; 2835; 2268; 1701; *c.* 894; 745; 596; 447; *d.* 4554; 3795; 3036; 2277; *e.* 5364; 4470; 3576; 2682. **7.** *a.* 4074; 3395; 2716; 2037; *b.* 1770; 1475; 1180; 885; *c.* 1758; 1465; 1172; 879; *d.* 2304; 1920; 1536; 1152; *e.* 5034; 4195; 3356; 2517. **8.** *a.* 5868; 4890; 3912; 2934; *b.* 5214; 4345; 3476; 2607; *c.* 4122; 3435; 2748; 2061; *d.* 4950; 4125; 3300; 2475; *e.* 5124; 4280; 3424; 2568. **9.** *a.* 1242; 1035; 828; 621; *b.* 5340; 4450; 3560; 2670; *c.* 5418; 4515; 3612; 2709; *d.* 4248; 3540; 2832; 2124; *e.* 3630; 3025; 2420; 1815.

Page 113. — $123. **4.** $132. **5.** 70¢. **6.** 117 pairs. **7.** 32 hogs. **8.** 213 baskets. **9.** 41 boxes.

Page 114. — **7.** *a.* 84 men; *b.* 75 hr.; *c.* 165 pt.; *d.* $83; *e.* 174¢. **8.** *a.* 73 horses; *b.* 36 da.; *c.* 63 gal.; $126; 112¢. **9.** *a.* 845; *b.* 1417; *c.* 1855; *d.* 875; *e.* 1690. **10.** *a.* 1138; *b.* 856; *c.* 273; *d.* 1400; *e.* 1401. **11.** *a.* 1405; *b.* 1808; *c.* 550; *d.* 840; *e.* 401.

Page 115. — **3.** *a.* 80; *b.* 100; *c.* 104; *d.* 90; *e.* 61. **4.** *a.* 120; *b.* 103; *c.* 41; *d.* 121; *e.* 102. **7.** *a.* 141; *b.* 144; *c.* 105; *d.* 1207; *e.* 1449. **8.** *a.* 112; *b.* 49; *c.* 140; *d.* 1268; *e.* 542. **10.** 16 men. **11.** 24 boxes.

Page 116. — **1.** *a.* 936; 1404; 1872; 2340; *b.* 912; 1368; 1824; 2280; *c.* 546; 819; 1092; 1365; *d.* 664; 996; 1328; 1660; *e.* 1268; 1902; 2536; 3170; *f.* 1608; 2412; 3216; 4020. **2.** *a.* 1368; 2052; 2736; 3420; *b.* 1308; 1962; 2616; 3270; *c.* 744; 1116; 1488; 1860; *d.* 466; 699; 932; 1165; *e.* 872; 1308; 1744; 2180; *f.* 1944; 2916; 3888; 4860. **3.** *a.* 472; 708; 944; 1180; *b.* 1128; 1692; 2256; 2820; *c.* 1464; 2196; 2928; 3660; *d.* 1096; 1644; 2192; 2740; *e.* 728; 1092; 1456; 1820; *f.* 1458; 2187; 2916; 3645. **4.** *a.* 1264; 1896; 2528; 3160; *b.* 1084; 1626; 2168; 2710; *c.* 824; 1236; 1648; 2060; *d.* 970; 1455; 1940; 2425; *e.* 368; 552; 736; 920; *f.* 1816; 2724; 3632; 4540. **5.** *a.* 1692; 2538; 3384; 4230; *b.* 904; 1356; 1808; 2260; *c.* 428; 642; 856; 1070; *d.* 1708; 2562; 3416; 4270; *e.* 836; 1254; 1672; 2090; *f.* 1780; 2670; 3560; 4450. **6.** *a.* 2556; 2130; 1704; 1278; *b.* 5088; 4240; 3392; 2544; *c.* 2448; 2040; 1632; 1224; *d.* 4788; 3990; 3192; 2394; *e.* 1494; 1245; 996; 747; *f.* 1704; 1420; 1136; 852. **7.** *a.* 1584; 1320; 1056; 792; *b.* 5064; 4220; 3376; 2532; *c.* 5040; 4200; 3360; 2520; *d.* 5382; 4485; 3588; 2691; *e.* 5652; 4710; 3768; 2826; *f.* 2568; 2140; 1712; 1284. **8.** *a.* 3744; 3120; 2496; 1872; *b.* 5118; 4265; 3412; 2559; *c.* 2880; 2400; 1920; 1440; *d.* 4734; 3945; 3156; 2367; *e.* 2574; 2145; 1716; 1287; *f.* 5052; 4210; 3368; 2526. **9.** *a.* 990; 825; 660; 495; *b.* 4740; 3950; 3160; 2370; *c.* 5886; 4905; 3924; 2943; *d.* 4074; 3395; 2716; 2037; *e.* 1542; 1285; 1028; 771; *f.* 5472; 4560; 3648; 2736. **10.** *a.* 3366; 2805; 2244; 1683; *b.* 5820; 4850; 3880; 2910; *c.* 1134; 945; 756; 567; *d.* 4776; 3980; 3184; 2388; *e.* 4350; 3625; 2900; 2175; *f.* 1152; 960; 768; 576. **11.** *a.* 912; 1824; 2736; 2280; *b.* 590; 1180; 1770; 1475; *c.* 434; 868; 1302; 1085; *d.* 1026; 2052; 3078; 2565; *e.* 1330; 2660; 3990; 3325; *f.* 1074; 2148; 3222; 2685. **12.** *a.* 1308; 2616; 3924; 3270; *b.* 1850; 3700; 5550; 4625; *c.* 344; 688; 1032; 860; *d.* 270; 540; 810; 675; *e.* 1312; 2624; 3936; 3280; *f.* 714; 1428; 2142; 1785. **13.** *a.* 1092; 2184; 3276; 2730; *b.* 1058; 2116; 3174; 2645; *c.* 1836; 2672; 5508;

4590; *d.* 300; 600; 900; 750; *e.* 500; 1000; 1500; 1250; *f.* 1280; 2560; 3840; 3200. **14.** *a.* 474; 948; 1422; 1185; *b.* 1184; 2368; 3552; 2960; *c.* 378; 756; 1134; 945; *d.* 1020; 2040; 3060; 2550; *e.* 1040; 2080; 3120; 2600; *f.* 920; 1840; 2760; 2300. **15.** *a.* 744; 1488; 2232; 1860; *b.* 1424; 2848; 4272; 3560; *c.* 1782; 3564; 5346; 4455; *d.* 1132; 2264; 3396; 2830; *e.* 1004; 2008; 3012; 2510; *f.* 1208; 2416; 3624; 3020. **16.** *a.* 618; 1030; 1236; 824; *b.* 1998; 3330; 3996; 2664; *c.* 810; 1350; 1620; 1080; *d.* 1422; 2370; 2844; 1896; *e.* 684; 1140; 1368; 912; *f.* 2772; 4620; 5544; 3696. **17.** *a.* 1860; 3100; 3720; 2480; *b.* 738; 1230; 1476; 984; *c.* 2160; 3600; 4320; 2880; *d.* 828; 1380; 1656; 1104; *e.* 846; 1410; 1692; 1128; *f.* 1476; 2460; 2952; 1968. **18.** *a.* 1371; 2285; 2742; 1828; *b.* 1278; 2130; 2556; 1704; *c.* 1116; 1860; 2232; 1488; *d.* 2466; 4110; 4932; 3288; *e.* 747; 1245; 1494; 996; *f.* 2226; 3710; 4452; 2968. **19.** *a.* 1425; 2375; 2850; 1900; *b.* 1926; 3210; 3852; 2568; *c.* 2169; 3615; 4338; 2892; *d.* 2178; 3630; 4356; 2904; *e.* 2538; 4230; 5076; 3384; *f.* 2856; 4760; 5712; 3808.

Page 117. — **1.** *a.* 112; *b.* 678; *c.* 300; *d.* 316. **2.** *a.* 123; *b.* 789; *c.* 125; *d.* 478. **3.** *a.* 234; *b.* 104; *c.* 432; *d.* 560. **4.** *a.* 345; *b.* 320; *c.* 70; *d.* 37. **5.** *a.* 456; *b.* 218; *c.* 65; *d.* 219. **6.** *a.* 567; *b.* 406; *c.* 280; *d.* 410. **7.** *a.* 345; *b.* 320; *c.* 560; *d.* 410. **8.** *a.* 456; *b.* 218; *c.* 478; *d.* 219. **9.** *a.* 567; *b.* 406; *c.* 316; *d.* 37. **10.** *a.* 678; *b.* 300; *c.* 280; *d.* 112. **11.** *a.* 789; *b.* 125; *c.* 65; *d.* 123. **12.** *a.* 316; *b.* 280; *c.* 406; *d.* 567. **13.** *a.* 478; *b.* 65; *c.* 218; *d.* 456. **14.** *a.* 560; *b.* 70; *c.* 320; *d.* 345. **15.** *a.* 410; *b.* 432; *c.* 104; *d.* 234. **16.** *a.* 219; *b.* 125; *c.* 789; *d.* 123. **17.** *a.* 896; *b.* 487; *c.* 2950; *d.* 804. **18.** *a.* 1226; *b.* 1288; *c.* 468; *d.* 1256. **19.** *a.* 1624; *b.* 1466; *c.* 1142; *d.* 878; **20.** *a.* 888; *b.* 1644; *c.* 628; *d.* 1742. **21.** *a.* 1110; *b.* 1822; *c.* 1514; *d.* 1504.

Page 118. — **6.** 2 qt.; 4 qt. **7.** 6¢. **8.** 48 qt. **9.** 20 qt.; 2 pk. **10.** 6 pk. **11.** 4 qt.

Page 119. — **5.** 40 qt.; 10 gal. **6.** 84¢. **7.** 12 qt. **8.** 24 pt.; 3 gal. **9.** 2 pt. **10.** 2 gal. **11.** 8 qt. **12.** 32 qt. **13.** 4 qt. **14.** 16 qt. **15.** 6 gal. **16.** 3 qt. **17.** 1 gal. **18.** 20 qt.

Page 120. — **3.** ½ lb. **4.** 16 oz.; 1 lb. **5.** 32 oz.; 2 lb. **6.** 4 oz.; 8 oz. **7.** 8 packages.

Page 121. — **3.** 1 lb. **4.** 42¢. **5.** 1 lb. **6.** 16 oz. **7.** 24 oz. **8.** ½ lb. **9.** ¼ lb. **10.** 32 oz. **11.** 20 oz. **12.** 16 oz. **13.** 1 lb. **14.** 4 oz. **15.** 16 oz. **16.** 1 lb. **17.** 8 oz. **18.** 99¢. **19.** 96 oz. **20.** 4 oz.; 24 oz. **21.** 9¢.

Page 122. — **6.** 18 ft. **7.** 36 in. **8.** 1 yd. **9.** 24 in. **10.** 1 ft. **11.** 6 yd. **12.** 36 in. **13.** 48 in. **14.** 30 in. **15.** 10 ft. **16.** 5 yd. **17.** 21 ft. **18.** 72 in. **19.** 24 in. **20.** 36 in. **21.** 12 ft. **22.** 18 ft. **23.** 9 yd. **24.** 8 yd. **25.** 7 yd. **26.** 4 yd. **27.** 72 ft. **28.** 144 ft. **29.** 108 ft. **30.** 16 ft.

Page 123. — **1.** 50 yd. **2.** 1080 ft. **3.** 320 yd. **4.** 72 in.; 2 yd. **5.** 13 yd.; 1 ft. over. **6.** 10 yd. **7.** 64 in. **8.** 72 in. **9.** 45 in. **10.** 300 yd. **11.** 46 yd.; 2 ft. over. **12.** 55 in.

Page 126. — **6.** 16 sq. in. **8.** 60 sq. ft. **9.** 450 sq. in.

Page 127. — **1.** 150 lb. **2.** 159 pages. **3.** 128 lb. **4.** 160 qt. **5.** 54 school months. **6.** $4.59. **7.** 6 mi. an hr.; 9 mi. an hr. **8.** 338 pupils; 24 more. **9.** 336 pounds. **10.** 720 pens. **11.** 144 sheets. **12.** 54¢.

Page 129. — **2.** 8 hr.; 8 hr. **3.** 7 da. **6.** 60 mo. **7.** 42 da. **8.** 144 hr. **9.** 240 min.

Page 130. — **7.** *a.* 3192; *b.* 1855; *c.* 1099; *d.* 6741; *e.* 6328. **8.** *a.* 54,173; *b.* 59,479; *c.* 43,386; *d.* 37,968; *e.* 44,373. **9.** *a.* 32,851; *b.* 52,696; *c.* 48,538; *d.* 60,032; *e.* 55,545. **10.** *a.* 50,456; *b.* 39,879; *c.* 17,283; *d.* 27,025; *e.* 56,658.

Page 131. — **5.** *a.* 12; *b.* 8; *c.* 8, rem. 3; *d.* 9, rem. 5; *e.* 6, rem. 3; *f.* 5, rem. 1. **6.** *a.* 31; *b.* 52; *c.* 61; *d.* 91; *e.* 39; *f.* 99, rem. 3. **7.** *a.* 348; *b.* 1232; *c.* 1242; *d.* 1309; *e.* 671. **8.** *a.* 521; *b.* 1150; *c.* 513; *d.* 299; *e.* 1618. **9.** *a.* 1055; *b.* 477; *c.* 362; *d.* 641; *e.* 996. **10.** 37 boxes. **11.** 7 weeks. **12.** 12 suits. **13.** 12 packages.

Page 132. — **7.** *a.* 59,840; *b.* 41,424; *c.* 69,032; *d.* 74,480; *e.* 62,920. **8.** *a.* 23,496; *b.* 69,552; *c.* 72,664; *d.* 69,576; *e.* 58,312. **9.** *a.* 72,384; *b.* 55,496; *c.* 22,920; *d.* 37,640; *e.* 65,088.

Page 133. — **11.** *a.* 80; *b.* 90; *c.* 50; *d.* 40; *e.* 100. **12.** *a.* 22; *b.* 103; *c.* 78; *d.* 59; *e.* 76. **13.** *a.* 1009; *b.* 262; *c.* 384; *d.* 511; *e.* 753. **14.** *a.* 363; *b.* 1013; *c.* 374; *d.* 988; *e.* 1075. **15.** 9 tablets. **16.** 30 chests.

Page 134. — **8.** *a.* 42,237; *b.* 65,574; *c.* 41,535; *d.* 78,642; *e.* 62,703; **9.** *a.* 37,215; *b.* 25,866; *c.* 57,582; *d.* 16,821; *e.* 63,387. **10.** *a.* 74,574; *b.* 33,273; *c.* 41,301; *d.* 26,037; *e.* 81,873. **11.** *a.* 84,483; *b.* 26,505; *c.* 84,456; *d.* 57,204; *e.* 25,776. **12.** *a.* 54,045; *b.* 71,046; *c.* 45,081; *d.* 54,810; *e.* 67,500. **13.** *a.* 45,180; *b.* 36,720; *c.* 27,666; *d.* 72,045; *e.* 89,991.

Page 135. — **1.** *a.* 38,034; *b.* 75,537; *c.* 34,074; *d.* 22,212; *e.* 74,889. **2.** *a.* 49,347; *b.* 60,228; *c.* 20,646; *d.* 74,961; *e.* 56,205. **3.** *a.* 57,564; *b.* 23,346; *c.* 44,712; *d.* 51,228; *e.* 84,366. **4.** *a.* 65,502; *b.* 65,214; *c.* 47,952; *d.* 66,474; *e.* 80,352. **5.** 342 gal.; 216 da.; 144 min. **6.** 153 bu.; 225 mo.; 225 horses. **7.** 108 ft.; $1.62; 315 cows.

Page 136. — **4.** *a.* 293; *b.* 206; rem. 2; *c.* 326; *d.* 854; *e.* 908. **5.** *a.* 709; *b.* 233; *c.* 343; *d.* 695; *e.* 804. **6.** *a.* 941; *b.* 418; *c.* 332; *d.* 245; *e.* 401. **7.** *a.* 843; *b.* 699; *c.* 966; *d.* 332; *e.* 677. **9.** 106 letters. **10.** 6 times. **11.** 9 melons.

Page 138. — **1.** 288 pt. **2.** 234 mi. **3.** $2.56. **4.** 3 hr. **5.** 23 lb. **6.** 21 cabbages. **7.** 99 bu. **8.** 99 gal. **9.** 41 wk. **10.** 38 da. **11.** 13¢. **12.** 18 yd. **13.** 6¢. **14.** 7 hr. **15.** 1152 sq. in.

Page 139. — **3.** One dollar, one nickel, and one penny (or any other coins amounting to $1.06). **4.** 32¢. **5.** $8.83. **6.** 68 cakes. **7.** $3600. **8.** $115. **9.** 422; 1059; 998.

Page 140.—**1.** *a.* 1st column: 72; 27. 2d column: 42; 56. **2.** *a.* 8 pk. **3.** *a.* 13 pk. **4.** *a.* 1122; 1096. **6.** *a.* 26; 23; 35. **1.** *b.* 45. **2.** *b.* 1st column: 77; 48. 2d column: 71; 84. **5.** *b.* 8053. **6.** *b.* 801. **1.** *c.* $201. **2.** *c.* 64 qt. **3.** *c.* 34; 42; 35; 43; 32; 42. **4.** *c.* 75 min. **5.** *c.* 30 hr. **1.** *d.* 90 pt. **2.** *d.* 144 oz. packages. **3.** *d.* 997. **4.** *d.* 113; 154. **5.** *d.* 2781; 4858.

FOURTH GRADE

Page 143.—**2.** *a.* 994; *b.* 820; *c.* 781; *d.* 1204; *e.* 831; *f.* 755. **3.** *a.* 1005; *b.* 853; *c.* 1733; *d.* 1442; *e.* 1490; *f.* 1932. **4.** *a.* 968; *b.* 962; *c.* 954; *d.* 1334; *e.* 189; *f.* 757. **5.** *a.* 1397; *b.* 1006; *c.* 1338; *d.* 1292; *e.* 1414; *f.* 1757.

Page 144.—**2.** *a.* 3695; *b.* 3494; *c.* 7421; *d.* 1763; *e.* 10,388. **3.** *a.* 7783; *b.* 5778; *c.* 10,805; *d.* 14,553; *e.* 11,997. **4.** *Page 66.* **6.** *a.* 784; *b.* 1118; *c.* 2040; *d.* 1196; *e.* 553; *f.* 1235; *g.* 561. **7.** *a.* 2050; *b.* 1397; *c.* 1433; *d.* 1609; *e.* 1569; *f.* 1695; *g.* 994. **8.** *a.* 1411; *b.* 2020; *c.* 1325; *d.* 838; *e.* 1654; *f.* 706; *g.* 1037. *Page 67.* **1.** *a.* 994; *b.* 820; *c.* 781; *d.* 1204; *e.* 831; *f.* 755. **2.** *a.* 1005; *b.* 853; *c.* 1733; *d.* 1442; *e.* 1490; *f.* 1932. **3.** *a.* 968; *b.* 962; *c.* 954; *d.* 1334; *e.* 189; *f.* 757. **4.** *a.* 1397; *b.* 1006; *c.* 1338; *d.* 1292; *e.* 1424; *f.* 1757.

Page 145.—**1.** 250. **2.** 484. **3.** 4631. **4.** 2704. **5.** 1305. **6.** 800. **7.** 834. **8.** 1175¢. **9.** $654. **10.** 187 pt. 1159 qt. **12.** 1109 pk.

Page 146.—**2.** *a.* 36; *b.* 35; *c.* 328; *d.* 238; *e.* 282; *f.* 1361. **3.** *a.* 326; *b.* 295; *c.* 326; *d.* 379; *e.* 365; *f.* 461.

Page 147.—**1.** 78. **2.** 159. **3.** 335. **4.** 22,595. **5.** 19,999. **6.** 14,177. **7.** 19,265. **8.** 15,189. **9.** 36 men. **10.** $676. **11.** 774 miles. **12.** 787 bu. **13.** $678.

Page 148.—**1.** *a.* 16,910; *b.* 20,524; *c.* 19,634; *d.* 18,184; *e.* 13,022. **2.** *a.* 18,330; *b.* 15,900; *c.* 16,996; *d.* 22,750; *e.* 21,607. **3.** *a.* 21,010; *b.* 24,150; *c.* 24,153; *d.* 26,261; *e.* 26,350.

Page 149.—**2.** *a.* 444; *b.* 468; *c.* 499; *d.* 182; *e.* 198; *f.* 209. **3.** *a.* 1030; *b.* 2092; *c.* 1987; *d.* 2305; *e.* 530; *f.* 118. **4.** *a.* 4779; *b.* 2708; *c.* 3062; *d.* 3378; *e.* 2428. **5.** *a.* 3257; *b.* 3827; *c.* 2882; *d.* 2457; *e.* 3018. **6.** 9047; 8860; 8673; 8486; 8299; 8112; 7925; 7738; 7551; 7364.

Page 150.—**2.** *a.* 346; *b.* 353; *c.* 222; *d.* 203; *e.* 428; *f.* 391. **3.** *a.* 37; *b.* 412; *c.* 273; *d.* 239; *e.* 19; *f.* 391. **4.** *a.* 106; *b.* 555; *c.* 142; *d.* 9; *e.* 152; *f.* 262. **6.** *a.* 395; *b.* 251; *c.* 252; *d.* 291; *e.* 451; *f.* 325. **7.** *a.* 192; *b.* 409; *c.* 123; *d.* 107; *e.* 180; *f.* 174.

Page 151.—**1.** *a.* 2256; *b.* 1873; *c.* 2596; *d.* 4117; *e.* 7359. **2.** *a.* 3009; *b.* 2808; *c.* 2999; *d.* 1088; *e.* 589. **3.** *a.* 2878; *b.* 2648; *c.* 1689; *d.* 1958; *e.* 3488. **4.** *a.* 2789; *b.* 1366; *c.* 3479; *d.* 4479; *e.* 2522. **5.** *a.* 3136; *b.* 5591; *c.* 3239; *d.* 1812; *e.* 2541. **6.** *a.* 1084; *b.* 2293; *c.* 4986; *d.* 1766; *e.* 3844. **7.** *a.* 3939; *b.* 2814; *c.* 1285; *d.* 1832; *e.* 4809. **8.** *a.* 3226; *b.* 1778; *c.* 1343; *d.* 2244; *e.* 950. **9.** 16,661.

10. 18,509. **11.** 15,823. **12.** 15,647. **13.** 13,602. **14.** 13,685.
15. 10,878. **16.** 12,246. **17.** 16,853. **18.** 23,280. **19.** 16,508.
20. 22,856. **21.** 21,697. **22.** 24,590. **23.** 12,835. **24.** 21,265.
25. 19,906. **26.** 22,014. **27.** 20,432. **28.** 23,239.

Page 152. — **1.** *a.* 1869; *b.* 819; *c.* 2639; *d.* 3479; *e.* 659. **2.** *a.* 1706; *b.* 1599; *c.* 1889; *d.* 494; *e.* 468. **3.** *a.* 2059; *b.* 1505; *c.* 3699; *d.* 948; *e.* 955. **4.** *a.* 3579; *b.* 4065; *c.* 489; *d.* 995; *e.* 2764. **5.** *a.* 749; *b.* 947; *c.* 2105; *d.* 3805; *e.* 3736. **6.** *a.* 3676; *b.* 487; *c.* 4405; *d.* 4006; *e.* 4798. **7.** 16,013. **8.** 10,498. **9.** 10,286. **10.** 12,133. **11.** 8931. **12.** 12,642. **13.** 15,452. **14.** 10,506. **15.** 10,279. **16.** 16,983. **17.** 11,789. **18.** 7850. **19.** 12,652. **20.** 14,863. **21.** 13,634.

Page 153. — **3.** *a.* 2987; *b.* 2695; *c.* 1197; *d.* 991; *e.* 172. **4.** *a.* 6503; *b.* 240; *c.* 1791; *d.* 5098; *e.* 1363. **5.** *a.* 1100; *b.* 3631; *c.* 3619; *d.* 1414; *e.* 203. **6.** *a.* 3695; *b.* 1070; *c.* 1192; *d.* 2504; *e.* 4893. **7.** *a.* 2097; *b.* 2802; *c.* 295; *d.* 1308; *e.* 1503.

Page 154. — **1.** 3749 pupils. **2.** $625. **3.** 3712 ft. **4.** 4385 people. **5.** 1511 boys. **6.** 5437 flags. **7.** 430 steps. **8.** 390 fares.

Page 156. — **1.** *a.* $913.87; *b.* $2489.87; *c.* $2269.27; *d.* $2624.92. **2.** *a.* $1444.03; *b.* $1521.75; *c.* $1347.07; *d.* $902.09. **3.** $1671.24. **4.** $873.44. **5.** $1292.77. **6.** $835.82. **7.** *a.* $279.08; *b.* $256.29; *c.* $242.91; *d.* $626.04. **8.** *a.* $97.77; *b.* $28.39; *c.* $167.51; *d.* $138.60. **9.** $71.62. **10.** $65.82.

Page 157. — **1.** *a.* $75.06; *b.* $87.08; *c.* $66.01; *d.* $75.26; *e.* $52.03. **2.** *a.* $163.61; *b.* $181.53; *c.* $156.05; *d.* $241.92; *e.* $255.09. Total, $998.20. Corn: $323.45; oats: $128.76; bran: $35.95; chop: $69.89; meal: $46.40; flour: $393.75. **3.** $3595.55. **4.** $11.55.

Page 158. — **3.** 16¢. **4.** 22¢. **5.** 19¢. **6.** 17¢. **7.** 15¢. **8.** 12¢. **9.** 22¢. **10.** 3¢.

Page 159. — **1.** 9¢. **2.** 19¢. **3.** 8¢. **4.** 5¢. **5.** 15¢. **6.** 20¢. **7.** 18¢. **8.** 5¢. **9.** 38¢. **10.** 11¢. **11.** 46¢. **12.** 13¢. **13.** 40¢. **14.** 55¢.

Page 160. — **1.** $28.09. **2.** $5.73. **3.** $3.09. **4.** $.90. **5.** $23.72. **6.** $3.68. **7.** 18 badges. **8.** 21 strokes. **9.** 64 sq. in. **10.** 71 oranges. **11.** 3 five-dollar bills, $2.86 over.

Page 161. — **2.** 846 bu. **3.** $103. **4.** 184 da. **5.** $16,995. **6.** $6572. **7.** 108 ft. **8.** 152 mi.

Page 162. — **3.** $10,905. **4.** 8847 votes. **5.** $4234. **6.** 8224 bu. **7.** 6199 increase. **8.** $739. **9.** 196 lb. **10.** 2669 votes.

Page 163. — **7.** 50¢. **8.** $50. **9.** 25¢. **10.** $1.26. **11.** 95¢. **12.** $1.25. **13.** 80¢. **14.** $8.20.

Page 165. — **2.** *a.* 394, rem. 1; *b.* 94, rem. 2; *c.* 396, rem. 1; *d.* 562, rem. 6. **3.** *a.* 116, rem. 1; *b.* 71, rem. 3; *c.* 145, rem. 5; *d.* 486, rem. 1. **4.** *a.* 59, rem. 2; *b.* 55, rem. 3; *c.* 233, rem. 1; *d.* 792, rem. 2. **6.** *a.* 132, rem. 1; 88, rem. 1; *b.* 432; 288; *c.* 393; 262; *d.* 312; 208; *e.* 3684; 2456. **7.** *a.* 356, rem. 1; 237, rem. 2; *b.* 109, rem. 1; 73; *c.* 132,

rem. 1; 88, rem. 1; *d.* 289; 192, rem. 2; *e.* 1228, rem. 1; 819. **8.** *a.* 67; *b.* 234; *c.* 1745, rem. 1; *d.* 968, rem. 2; *e.* 1219. **9.** *a.* 216; *b.* 117; *c.* 1258, rem. 2; *d.* 547, rem. 2; *e.* 960, rem. 1.

Page 166. — **3.** First column: 5580; 5115. 6552; 6006. 9408; 8624. 9420; 8635. 11,736; 10,758. Second column: 2832; 2596. 9396; 8613. 11,244; 10,307. 6168; 5654. 8328; 7634. Third column: 9468; 8679. 11,136; 10,208. 8316; 7623. 11,256; 10,318. 3552; 3256. **5.** *a.* 1824; *b.* 3168; *c.* 4452; *d.* 5616; *e.* 1872; *f.* 1644. **6.** *a.* 2124; *b.* 1584; *c.* 936; *d.* 1152; *e.* 2820; *f.* 4068. **7.** *a.* 4608; *b.* 9360; *c.* 6348; *d.* 9540; *e.* 6948; *f.* 8472. **8.** *a.* 3492; *b.* 2772; *c.* 7248; *d.* 4860; *e.* 2808; *f.* 7068. **9.** 144 eggs. **10.** 2352 lb.

Page 167. — **6.** 6 periods. **7.** 9 qt. **8.** 14 hr. **9.** 5 ¢.

Page 168. — **4.** 248, rem. 10. **5.** 754. **6.** 185, rem. 1. **7.** 632, rem. 2. **8.** 362, rem. 4. **9.** 273, rem. 4. **10.** 811, rem. 2. **11.** 196, rem. 2. **12.** 732, rem. 5. **13.** 6341, rem. 2. **14.** 6642, rem. 3. **15.** 8188, rem. 6. **19.** 306, rem. 6. **20.** 344, rem. 7. **21.** 581, rem. 1. **22.** 594. **23.** 391, rem. 1. **24.** 651, rem. 5. **25.** 244, rem. 8. **26.** 769, rem. 10. **27.** 391, rem. 5. **28.** 782. **29.** 3516. **30.** 5781, rem. 6. **31.** 6162, rem. 1. **32.** 6888, rem. 3. **33.** 3108. **34.** 7656, rem. 3. **35.** 2060, rem. 6. **36.** 5696, rem. 7. **37.** 6813, rem. 7. **38.** 7697.

Page 172. — **9.** 14,200. **10.** 25,500. **11.** 98,000. **12.** 500,500. **13.** 6940. **14.** 12,270. **15.** 42,900. **16.** 26,320. **17.** 42,750. **18.** 146,500. **19.** 550,200. **20.** 73,600. **21.** 477,600. **22.** 166,400. **23.** 96,200. **24.** 357,600. **25.** 634,200. **26.** 655,200. **27.** 43,800.

Page 175. — **1.** 410, rem. 3. **2.** 1233, rem. 1. **3.** 532, rem. 5. **4.** 1024, rem. 4. **5.** 884, rem. 7. **6.** 1272, rem. 6. **7.** 267. **8.** 1021, rem. 5. **9.** 699, rem. 3. **10.** 923, rem. 3. **11.** 977, rem. 1. **12.** 1043. **13.** 1024, rem. 5. **14.** 770, rem. 4. **15.** 1125, rem. 4. **16.** 500, rem. 3. **17.** 988, rem. 4. **18.** 420, rem. 4. **19.** 1319, rem. 1. **20.** 859, rem. 3. **21.** 459, rem. 1. **22.** 667, rem. 7. **23.** 766. **24.** 1013. **25.** 459, rem. 2. **26.** 958, rem. 7. **27.** 1159, rem. 1. **28.** 2143. **29.** 6639. **30.** 3332. **31.** 1553. **32.** 1002. **33.** 6168. **34.** 5770. **35.** 2522. **36.** 2226. **37.** 917. **38.** 2042. **39.** 2660. **40.** 4791. **41.** 4414. **42.** 4563. **43.** 1494. **44.** 3357. **45.** 1963. **46.** 4207. **47.** 1055. **48.** 3042. **49.** 3523. **50.** 3274. **51.** 741. **52.** 4534. **53.** 2120. **54.** 3809.

Page 177. — **6.** *a.* 14,472; *b.* 20,640; *c.* 20,712; *d.* 26,775; *e.* 34,658. **7.** *a.* 20,884; *b.* 23,256; *c.* 48,111; *d.* 45,449; *e.* 33,813.

Page 178. — **1.** 9798. **2.** 15,252. **3.** 8448. **4.** 9824. **5.** 11,567. **6.** 8289. **7.** 19,368. **8.** 46,368. **9.** 25,324. **10.** 23,458. **11.** 21,754. **12.** 28,992. **13.** 29,160. **14.** 77,658. **15.** 54,826. **16.** 82,592. **17.** 54,450. **18.** 9772. **19.** 432,288. **20.** 202,050. **21.** 304,076. **22.** 287,631. **23.** 355,992. **24.** 207,718. **25.** 352,408. **26.** 52,780. **27.** 73,818. **32.** 33,799. **33.** 78,792. **34.** 66,215. **35.** 85,728. **36.** 86,775. **37.** 84,574. **38.** 60,648. **39.** 828,996. **40.** 304,854. **41.** 441,441. **42.** 449,550. **43.** 487,704. **44.** 258,129. **45.** 402,742. **46.** 243,404. **47.** 361,959. **48.** 346,625. **49.** 227,864. **50.** 882,784. **51.** 639,110. **52.** 658,674.

Page 179. — **2.** 173,250. **3.** 154,375. **4.** 68,769. **5.** 97,188. **6.** 79,232. **7.** 355,266. **8.** 143,352. **9.** 400,792. **10.** 152,055. **11.** 272,527. **12.** 436,792. **13.** 925,806. **14.** 374,274. **15.** 801,975. **16.** 228,717. **17.** 79,086. **18.** 78,684. **19.** 816,249. **20.** 510,130. **21.** 734,454. **22.** 562,326. **23.** 580,622. **24.** 128,425. **25.** 707,277. **26.** 739,692. **27.** 345,066. **28.** 477,240. **29.** 760,062. **30.** 323,555.

Page 180. — **2.** *a.* 158,632; *b.* 84,150; *c.* 173,340; *d.* 155,342; *e.* 360,172. **3.** *a.* 74,844; *b.* 357,336; *c.* 127,072; *d.* 566,820; *e.* 551,156. **6.** 261,100. **7.** 142,080. **8.** 89,760. **9.** 209,588. **10.** 113,800.

Page 181. — **14.** 573; 204; 262; 609. **15.** 8070; 7470; 506; 755.

Page 182. — **5.** 21; 32; 43.

Page 183. — **1.** 12. **2.** 25. **3.** 41. **4.** 34. **5.** 31. **6.** 17. **7.** 24. **8.** 114, rem. 4. **9.** 125. **10.** 23. **11.** 29. **12.** 217. **13.** 203. **14.** 307. **15.** 403. **16.** 119, rem. 30. **17.** 32. **18.** 207. **19.** 62. **20.** 71. **21.** 33.

Page 184. — **1.** 42. **2.** 43. **3.** 24. **4.** 39. **5.** 15. **6.** 27. **7.** 19. **8.** 21. **9.** 37. **10.** 29. **11.** 16. **12.** 30. **13.** 25. **14.** 32. **15.** 42. **16.** 6. **17.** 25. **18.** 24. **19.** 29. **20.** 7. **21.** 21. **22.** 29. **23.** 5. **24.** 6. **25.** 14. **26.** 26. **27.** 17. **28.** 19. **29.** 23. **30.** 56. **31.** 27. **32.** 35. **33.** 24. **34.** 38. **35.** 40. **36.** 41. **37.** 31. **38.** 160. **39.** 220. **40.** 32. **41.** 33. **42.** 72. **43.** 64. **44.** 28. **45.** 29. **46.** 44. **47.** 45. **48.** 36. **49.** 52 da. **50.** 16 oz. **51.** 895 bu. **52.** 9 hr. **53.** 14 hr. **54.** 216 bu.

Page 185. — **2.** 47. **3.** 45, rem. 18. **4.** 62. **5.** 77, rem. 19. **6.** 247, rem. 2. **7.** 67, rem. 18. **8.** 83, rem. 19. **9.** 77, rem. 19. **10.** 53, rem. 61. **11.** 62. **12.** 41. **13.** 61. **14.** 63, rem. 2. **15.** 65, rem. 44. **16.** 77. **17.** 44, rem. 56. **18.** 59, rem. 60. **19.** 47. **20.** 76, rem. 6. **21.** 86, rem. 2. **22.** 83, rem. 23. **23.** 24, rem. 55. **24.** 73, rem. 76. **25.** 183, rem. 22. **26.** 52, rem. 30. **27.** 94, rem. 84. **28.** 318, rem. 21. **29.** 8 bbl. **30.** 8 bbl.; 4 gal. over.

Page 186. — **2.** 572, rem. 10. **3.** 804. **4.** 503. **5.** 906. **6.** 702. **7.** 608. **8.** 305. **9.** 801. **10.** 802. **11.** 203. **12.** 504. **13.** 708. **14.** 913, rem. 34. **15.** 308, rem. 53. **16.** 768, rem. 15. **17.** 705. **18.** 404, rem. 48. **19.** 507. **20.** 850, rem. 96. **21.** 807. **22.** 604.

Page 187. —

1.	*a.* 186,230;	*b.* 380,925;	*c.* 423,250;	*d.* 727,990;	*e.* 643,340;
	f. 829,570;	*g.* 474,040;	*h.* 584,085;	*i.* 821,105;	*j.* 753,385.
2.	*a.* 168,190;	*b.* 344,025;	*c.* 382,250;	*d.* 657,470;	*e.* 581,020;
	f. 749,210;	*g.* 428,120;	*h.* 527,505;	*i.* 741,565;	*j.* 680,405.
3.	*a.* 192,302;	*b.* 393,345;	*c.* 437,050;	*d.* 751,726;	*e.* 664,316;
	f. 856,618;	*g.* 489,496;	*h.* 603,129;	*i.* 847,877;	*j.* 777,949.
4.	*a.* 216,920;	*b.* 443,700;	*c.* 493,000;	*d.* 847,960;	*e.* 749,360;
	f. 966,280;	*g.* 552,160;	*h.* 680,340;	*i.* 956,420;	*j.* 877,540.
5.	*a.* 185,350;	*b.* 379,125;	*c.* 421,250;	*d.* 724,550;	*e.* 640,300;
	f. 825,650;	*g.* 471,800;	*h.* 581,325;	*i.* 817,225;	*j.* 749,825.
6.	*a.* 212,388;	*b.* 434,430;	*c.* 482,700;	*d.* 830,244;	*e.* 733,704;
	f. 946,092;	*g.* 540,624;	*h.* 666,126;	*i.* 936,438;	*j.* 859,206.

7. *a*. 173,118; *b*. 354,105; *c*. 393,450; *d*. 676,734; *e*. 598,044; *f*. 771,162; *g*. 440,664; *h*. 542,961; *i*. 763,293; *j*. 700,341.
8. *a*. 214,830; *b*. 439,425; *c*. 488,250; *d*. 839,790; *e*. 742,140; *f*. 956,970; *g*. 546,840; *h*. 673,785; *i*. 947,205; *j*. 869,085.
9. *a*. 107,250; *b*. 219,375; *c*. 243,750; *d*. 419,250; *e*. 370,500; *f*. 477,750; *g*. 273,000; *h*. 336,375; *i*. 472,875; *j*. 433,875;
10. *a*. 185,240; *b*. 378,900; *c*. 421,000; *d*. 724,120; *e*. 639,920. *f*. 825,160; *g*. 471,520; *h*. 580,980; *i*. 816,740; *j*. 749,380.

13. *a*. 985, rem. 55; *b*. 1086, rem. 57; *c*. 931, rem. 44; *d*. 1436, rem. 41; *e*. 1177, rem. 21; *f*. 1265, rem. 10; *g*. 1033, rem. 59; *h*. 1304, rem. 5.
14. *a*. 670, rem. 52; *b*. 739, rem. 30; *c*. 633, rem. 69; *d*. 977, rem. 29; *e*. 801; *f*. 860, rem. 52; *g*. 703, rem. 26; *h*. 887, rem. 17.
15. *a*. 938, rem. 52; *b*. 1034, rem. 68; *c*. 887, rem. 3; *d*. 1368, rem. 8; *e*. 1121, rem. 8; *f*. 1204, rem. 52; *g*. 984, rem. 32; *h*. 1241, rem. 55.
16. *a*. 589, rem. 70; *b*. 650, rem. 24; *c*. 557, rem. 37; *d*. 859, rem. 43; *e*. 704, rem. 36; *f*. 757, rem. 5; *g*. 618, rem. 48; *h*. 780, rem. 24.
17. *a*. 708, rem. 37; *b*. 781, rem. 7; *c*. 669, rem. 46; *d*. 1032, rem. 37; *e*. 846, rem. 13; *f*. 909, rem. 22; *g*. 742, rem. 81; *h*. 937, rem. 20.
18. *a*. 1004, rem. 68; *b*. 1107, rem. 66; *c*. 949, rem. 53; *d*. 1464, rem. 36; *e*. 1200, rem. 12; *f*. 1289, rem. 49; *g*. 1053, rem. 66; *h*. 1329, rem. 27.
19. *a*. 888, rem. 44; *b*. 979, rem. 50; *c*. 839, rem. 63; *d*. 1295, rem. 7; *e*. 1061, rem. 20; *f*. 1140, rem. 32; *g*. 931, rem. 70; *h*. 1175, rem. 37.
20. *a*. 970, rem. 36; *b*. 1069, rem. 74; *c*. 917, rem. 9; *d*. 1414, rem. 30; *e*. 1159, rem. 8; *f*. 1245, rem. 41; *g*. 1017, rem. 62; *h*. 1283, rem. 61.

Page 188. — **9**. *a*. 504, rem. 92; *b*. 346, rem. 75; *c*. 41. **10**. *a*. 230, rem. 133; *b*. 322; *c*. 199, rem. 90. **11**. *a*. 339, rem. 26; *b*. 256, rem. 95; *c*. 32, rem. 442. **12**. *a*. 75, rem. 236; *b*. 427, rem. 66; *c*. 201, rem. 350. **13**. *a*. 283, rem. 90; *b*. 302, rem. 247; *c*. 215, rem. 119. **14**. *a*. 382, rem. 103; *b*. 441, rem. 136; *c*. 208, rem. 220.

Page 191. — **4**. 260 ft. **5**. 14 ft.; 4⅔ yd. **6**. 160 rd.; 140 rd. **7**. 150 ft. **8**. 3 ft. **9**. 120 in. **10**. 4 yd. **11**. 9 ft. **12**. 2 rd. **13**. 11 yd. **14**. 2 mi. **15**. 960 rd. **16**. 2 mi. **17**. 15,840 ft. **18**. 3 mi. **19**. 3200 rd.

Page 192. — **5**. 1152 sq. in. **6**. 6 sq. ft. **7**. 90 sq. ft.

Page 193. — **5**. 108 sq. ft. **6**. 1200 sq. ft. **8**. 8 sq. ft. **9**. 432 sq. in. **10**. 2 sq. ft. **11**. 720 sq. in. **12**. 3 sq. yd. **13**. 45 sq. ft.

Page 194. — **5**. 180 sec. **6**. 144 hr. **7**. 420 min. **8**. 78 hr. **9**. 76 da. **10**. 91 da.; 92 da.

Page 195. — **2**. 90 min. **3**. 270 min.; 4½ hr. **4**. 180 min.; 3 hr. **5**. 45 min. **6**. 35 min. **7**. 90 hr. **8**. 120 strokes. **9**. 28 ¢. **10**. 10 hr. 5 min.

Page 196. — **4**. 16,000 lb.; 14,000 lb.; 24,000 lb. **5**. 3 T. 1460 lb. **6**. 30 T. **7**. 6 T. 1500 lb. **8**. 2 lb. **9**. 4 lb. **10**. 80 oz. **11**. 64 oz. **12**. 2 T. **13**. 4 T. **14**. 10,000 lb. **15**. 20,000 lb.

Page 197. — **1**. 48 ¢. **2**. 4000 packages. **3**. 1½ T. **4**. 2000 lb. or 1 T. **5**. 60 bags. **6**. 18 ¢. **7**. 384 oz. **8**. 48 ¢. **9**. 3 T. 500 lb.

10. 3000 lb.; 2500 lb.; 5000 lb. **11.** 1 T. 720 lb. **12.** 85 packages. **13.** 161 oz. more.

Page 199. — **1.** 1 pt. **2.** 1 qt. **3.** 1 qt. **4.** 8 oz. **5.** 30 min. **6.** 15 min. **7.** 3 hr. **8.** 6. **9.** 3. **10.** 2 qt. **11.** 30 sec. **12.** 6 hr. **13.** 2 qt. **14.** 4 oz. **15.** 2 oz. **16.** 2640 ft. **17.** 160 rd. **18.** 72 sq. in. **19.** 1320 ft. **20.** 660 ft. **21.** $\frac{1}{2}$. **22.** 45 min. **23.** $\frac{1}{3}$ yd. **24.** $\frac{3}{4}$ yd. **25.** 12¢. **26.** 3¢. **27.** 20¢.

Page 200. — **1.** *a.* 141,372. **2.** *a.* Three hundred eighty-seven thousand six hundred forty-two. **3.** *a.* $125.13. **4.** *a.* 108, rem. 54. **5.** *a.* 5663. **1.** *b.* $13.53. **2.** *b.* 34, rem. 27. **3.** *b.* $\frac{7}{8}$. **4.** *b.* 547,400. **5.** *b.* 109, rem. 76. **1.** *c.* 120,000. **2.** *c.* 5753. **3.** *c.* 940, rem. 60. **5.** *c.* 254,040. **1.** *d.* 936 greater. **2.** *d.* 204,452. **3.** *d.* 403, rem. 29. **4.** *d.* 968. **5.** *d.* 7006. **1.** *e.* $66.32. **2.** *e.* 92, rem. 693. **3.** *e.* $7660.80. **4.** *e.* Six hundred thousand seven hundred ten. **1.** *f.* LXXXVII; **2.** *f.* 164; **3.** *f.* 190, rem. 174; **4.** *f.* $\frac{1}{4}$ greater; **5.** *f.* $62,100.

Page 201. — **5.** By columns: 119; 245; 68; 193; 310; 71; 39; 54. **6.** MCD; MD; MDC; CM; MCMXIII; MCDXCII.

Page 202. — **1.** *a.* $3569.11; *b.* $1980.73; *c.* $3351.74; *d.* $1801.11. **2.** *a.* $2578.31; *b.* $4340.01; *c.* $5037.33; *d.* 4154.59. **3.** *a.* $3490.40; *b.* $13,565.92; *c.* $3355.63; *d.* $15,631.90.

Page 203. — **1.** $29,507.28. **2.** $4644.85. **3.** $3660.64. **4.** $658,373.86. **5.** $21,684.52.

Page 204. —

1.	*a.* $681.83;	*b.* $748.19;	*c.* $614.95;	*d.* $681.68.
2.	*a.* $286.42;	*b.* $159.45;	*c.* $800.99;	*d.* $511.68.
3.	*a.* $304.49;	*b.* $713.35;	*c.* $195.01;	*d.* $366.44.
4.	*a.* $784.66;	*b.* $812.60;	*c.* $ 32.45;	*d.* $233.45.
5.	*a.* $412.34;	*b.* $444.45;	*c.* $511.70;	*d.* $ 2.32.
6.	*a.* $511.78;	*b.* $256.77;	*c.* $730.87;	*d.* $653.09.
7.	*a.* $642.19;	*b.* $775.47;	*c.* $732.60;	*d.* $137.96.
8.	*a.* $364.93;	*b.* $176.05;	*c.* $386.08;	*d.* $453.11.

Page 205. —

1.	*a.* $211.70;	*b.* $128.45;	*c.* $33,812.37;	*d.* $ 1979.02.
2.	*a.* $310.20;	*b.* $227.74;	*c.* $15,577.79;	*d.* $ 724.73.
3.	*a.* $923.68;	*b.* $596.88;	*c.* $17,950.52;	*d.* $ 8694.69.
4.	*a.* $387.06;	*b.* $218.02;	*c.* $17,619.20;	*d.* $ 2563.59.
5.	*a.* $ 46.06;	*b.* $ 23.08;	*c.* $ 148.92;	*d.* $ 7986.86.
6.	*a.* $ 63.00;	*b.* $ 51.94;	*c.* $ 129.37;	*d.* $ 5873.83.
7.	*a.* $ 54.85;	*b.* $ 52.05;	*c.* $ 463.54;	*d.* $57,529.24.
8.	*a.* $ 8.03;	*b.* $ 23.52;	*c.* $ 241.08;	*d.* $17,879.01.
9.	*a.* $ 52.83;	*b.* $ 72.20;	*c.* $ 61.44;	*d.* $14,140.29.

Page 206. — **4.** *a.* $7; *b.* $12.20; *c.* $18.15; *d.* $47; *e.* $28.16. **5.** *a.* $3; *b.* $.24; *c.* $2.96; *d.* $2.45; *e.* $4.75. **6.** $1.95. **7.** $1.80. **8.** $19.00. **9.** $9.

Page 207. — **1.** $2.96. **2.** $1.26. **3.** $10.60. **4.** $3.36. **5.** $4.50. **6.** $9.60. **7.** $2.88. **8.** $.48. **9.** $2.12. **10.** $7.05. **11.** $1.64.

12. By 7: *a.* $29.89; *b.* $4326; *c.* $4900; *d.* $37.45. By 10: *a.* $42.70; *b.* $6180; *c.* $7000; *d.* $53.50. By 24: *a.* $102.48; *b.* $14,832; *c.* $16,800; *d.* $128.40. By 236: *a.* $1007.72; *b.* $145,848; *c.* $165,200; *d.* $1262.60. **13.** By 7: *a.* $67.55; *b.* $260.75; *c.* $6.09; *d.* $47.25. By 10: *a.* $96.50; *b.* $372.50; *c.* $8.70; *d.* $67.50. By 24: *a.* $231.60; *b.* $894; *c.* $20.88; *d.* $162. By 236: *a.* $2277.40; *b.* $8791; *c.* $205.32; *d.* $1593. **14.** By 7: *a.* $3.36; *b.* $2688; *c.* $48.65; *d.* $31.08. By 10: *a.* $4.80; *b.* $3840; *c.* $69.50; *d.* $44.40. By 24: *a.* $11.52; *b.* $9216; *c.* $166.80; *d.* $106.54. By 236: *a.* $113.28; *b.* $90,624; *c.* $1640.20; *d.* $1047.84. **15.** By 7: *a.* $3.50; *b.* $665.35; *c.* $34.23; *d.* $69.93. By 10: *a.* $5; *b.* $950.50; *c.* $48.90; *d.* $99.90. By 24: *a.* $12; *b.* $2281.20; *c.* $117.36; *d.* $239.76. By 236: *a.* $118; *b.* $22,431.80; *c.* $1154.04; *d.* $2357.64. **16.** $66. **17.** $119.20.

Page 208. — **1.** 11 seats. **2.** 6 seats. **3.** 162 fares. **4.** $8.10. **5.** $.20. **6.** 44 persons. **7.** $12.50. **8.** $13.75; 25¢ more. **9.** 80 mi. **10.** $2.45.

Page 209. — **1.** $3.75. **2.** $21.57. **3.** $15.50. **4.** 300 good ones. **5.** $1.80. **6.** $1.44; $.56. **8.** $13.86. **9.** 168 lines. **11.** $375.

Page 210. — **4.** $957. **5.** $4085. **6.** $17.82. **7.** 654 pt. **8.** 10,140 in. **9.** 656 pk.

Page 213. — **2.** $3. **3.** $6\frac{1}{2}$. **4.** 7 gal. **5.** $5\frac{1}{2}$ pt. **6.** 9 bu. **7.** 9 hr. **8.** *a.* 11; *b.* 23; *c.* $36\frac{3}{4}$; *d.* $20\frac{3}{4}$; *e.* 27; *f.* 30. **9.** *a.* $52\frac{1}{2}$; *b.* 57; *c.* 90. *d.* 2; *e.* 29; *f.* 60. **10.** $5\frac{1}{2}$. **11.** 2. **12.** 5. **13.** 4. **14.** 7. **15.** $6\frac{1}{4}$. **16.** $1\frac{1}{4}$. **17.** $11\frac{1}{2}$. **18.** 16. **19.** $1\frac{1}{4}$. **20.** 9. **21.** 1. **22.** $12\frac{1}{2}$. **23.** $8\frac{1}{4}$. **24.** $7\frac{1}{2}$.

Page 214. — **7.** $10\frac{3}{8}$. **8.** $24\frac{3}{8}$. **9.** $22\frac{1}{2}$. **10.** $26\frac{1}{4}$. **11.** $20\frac{5}{8}$. **13.** $5\frac{1}{8}$; $15\frac{5}{8}$. **14.** $6\frac{1}{4}$; $18\frac{1}{2}$. **15.** $19\frac{1}{2}$; $35\frac{7}{8}$. **16.** $13\frac{1}{8}$; $25\frac{3}{8}$. **17.** $20\frac{1}{4}$; $52\frac{7}{8}$. **18.** $31\frac{1}{2}$; $93\frac{3}{4}$. **19.** $24\frac{1}{4}$; $102\frac{1}{2}$. **20.** $2\frac{1}{8}$; $50\frac{7}{8}$. **21.** 9; $27\frac{3}{4}$. **22.** $20\frac{1}{4}$; $60\frac{1}{2}$.

Page 215. — **1.** 6 T. **2.** $6\frac{1}{2}$ gal. **3.** $1625\frac{1}{4}$ gal. **4.** 59 bu. **5.** $2\frac{1}{2}$ bu. **6.** 11 yd. **7.** 8 yd. **8.** $288. **9.** 92 lb. **10.** $1\frac{1}{2}$ gal. **11.** 69 ft.

Page 216. — **1.** 120 ft. **2.** $20. **3.** $26. **4.** $156. **5.** 41. **6.** $36. **7.** $400. **8.** $22.24.

Page 217. — **6.** 6. **7.** 8. **8.** 8. **9.** 21. **10.** 16. **11.** 15. **12.** 12. **13.** 21. **14.** 8. **15.** 8. **16.** 7. **17.** 42. **18.** 14. **19.** 15. **20.** 16. **21.** 21. **22.** 26. **23.** 40. **24.** 50. **25.** 30. **26.** 72. **27.** 72. **28.** 96. **29.** 204. **30.** $16. **31.** $12. **32.** $25. **33.** $12. **34.** $15. **35.** 9 lb. **36.** 6 ft. **37.** 4 yd. **38.** 12 gal. **39.** 6 bu. **40.** $4.10. **41.** $4.20. **42.** $5.10. **43.** $5.30. **44.** $6.05.

Page 218. — **1.** 2,179,584. **2.** 7,611,881. **3.** 4,457,880. **4.** 4,086,420. **5.** 2,264,192. **6.** 1,248,051. **7.** 6,356,256. **8.** 2,450,856. **9.** 4,569,706. **10.** 6,348,090. **11.** $32,682.10. **12.** $53,352.25. **13.** $20,693.28. **14.** $36,042.60. **15.** $39,147.42. **16.** 5,751,635. **17.** 420,104. **18.** 1,239,150. **19.** 2,359,875. **20.** 2,209,106. **21.** 2,989,472. **22.** 6,167,430. **23.** 3,675,846. **24.** 4,516,338. **25.** 6,308,816. **26.** 6,133,640. **27.** 5,381,360. **28.** 5,940,102. **29.** 6,161,427. **30.** 3,924,462. **31.** 6,236,576. **32.** 3,490,062. **33.** 2,982,640. **34.** 3,183,404. **35.** 2,556,048. **36.** 1,046,068. **37.** 4,606,036.

38. 3,375,374. **39.** 5,407,454. **40.** 5,632,452. **41.** 3,387,215. **42.** 5,286,660. **43.** 7,001,232. **44.** 4,993,515. **45.** 3,901,590. **46.** 433,125 cakes. **47.** 770,350 articles. **48.** $430.50. **49.** $105,022.50.

Page 219. — **1.** 45¢. **2.** $2.88. **3.** $23.75. **4.** $46.50. **5.** $288. **6.** $28.50. **7.** 24¢. **8.** 60¢. **9.** $7.50. **10.** $8.75. **11.** $7.98. **12.** $510. **14.** $1.02. **15.** $5. **16.** $9.90. **17.** $1.20. **18.** $1.50. **19.** $3.51. **20.** $2.70. **21.** $1.68. **22.** $2.64. **23.** $1.04. **24.** $2.90. **25.** 50¢.

Page 220. — **1.** 377, rem. 115. **2.** 365, rem. 50. **3.** 198, rem. 24. **4.** 246, rem. 120. **5.** 209, rem. 279. **6.** 232, rem. 140. **7.** 222, rem. 365. **8.** 194, rem. 148. **9.** 112, rem. 550. **10.** 160, rem. 424. **11.** 100, rem. 99. **12.** 78, rem. 635. **13.** 141, rem. 671. **14.** 113, rem. 330. **15.** 748, rem. 94. **16.** 96, rem. 383. **17.** 135, rem. 36. **18.** 122, rem. 640. **19.** 220, rem. 8. **20.** 130, rem. 39. **21.** 345, rem. 163. **22.** 113, rem. 498. **23.** 123, rem. 192. **24.** 113, rem. 183. **25.** 336, rem. 345. **26.** 518, rem. 272. **27.** 1001, rem. 136. **28.** 2107, rem. 412. **29.** 2155, rem. 97. **30.** 1429, rem. 516. **31.** 1704, rem. 103. **32.** 1390, rem. 59. **33.** 3551, rem. 145. **34.** 2743, rem. 302. **35.** 1987, rem. 277. **36.** 3191, rem. 144. **37.** 1005, rem. 120. **38.** 8798, rem. 56. **39.** 7415, rem. 12. **40.** 1385, rem. 165. **41.** 1242, rem. 33. **42.** 4936, rem. 60. **43.** 2583, rem. 15. **44.** 2588, rem. 84.

Page 221. — **4.** 34, rem. 2056. **5.** 27, rem. 2340. **6.** 34, rem. 1075. **7.** 12, rem. 2273. **8.** 38, rem. 204. **9.** 16, rem. 825. **10.** 23, rem. 878. **11.** 17, rem. 942. **12.** 9, rem. 1730. **13.** 65, rem. 1263. **14.** 1877, rem. 274. **15.** 773, rem. 198. **16.** 718, rem. 207. **17.** 1134, rem. 58. **18.** 773, rem. 466. **19.** 1058, rem. 212. **20.** 924, rem. 520. **21.** 819, rem. 553. **22.** 1162, rem. 270. **23.** 174, rem. 87.

Page 222. — **1.** *a.* 19,720; 308, rem. 1; 22,185; 273, rem. 8. *b.* 19,752; 308, rem. 5; 22,221; 274, rem. 3. *c.* 22,528; 352; 25,344; 312, rem. 8. *d.* 54,592; 853; 61,416; 758, rem. 2. *e.* 49,424; 772, rem. 2; 55,602; 686, rem. 4. **2.** *a.* 59,048; 922, rem. 5; 66,429; 820, rem. 1. *b.* 67,176; 1049, rem. 5; 75,573; 933. *c.* 75,000; 1171, rem. 7; 84,375; 1041, rem. 6. *d.* 38,688; 604, rem. 4; 43,524; 537, rem. 3. *e.* 66,344; 1036, rem. 5; 74,637; 921, rem. 4. **3.** 2007 sheep. **4.** 3516 horses. **5.** 3268 bu. **6.** 1242 gal. **7.** 1350. **8.** 1662. **9.** $8.50. **10.** $7.80. **11.** $4. **12.** $1.25. **13.** $14. **14.** $6.75. **15.** $8.25. **16.** $5.25. **17.** $15. **18.** $9. **19.** $21. **20.** $12.15. **21.** $21. **22.** $8.75. **23.** $25.55. **24.** $22.50. **25.** $36. **26.** $10.80.

Page 223. — **1.** 104 ft. **2.** $38.50. **3.** $4.05. **4.** 320 min. **5.** $525. **6.** $32.25.

Page 224. — **1.** 28 yd. **2.** $2.24. **3.** 19 caps. **4.** 30 pupils. **5.** $1.26. **6.** $5.74. **7.** $4.45.

Page 225. — **1.** $20. **2.** $1.26. **3.** $2.75. **4.** $2.24. **5.** $15.75. **6.** $48.60. **7.** $2. **8.** $6.80. **9.** $15.75. **10.** $16.88. **11.** $1.96. **12.** $14.25. **13.** $12. **14.** $9.96. **15.** $114.50. **16.** $3.74.

Page 226. — **1.** $4.20. **2.** $11.16. **3.** $11.76. **4.** $13.58. **5.** $10.32. **6.** $29.75. **7.** $12.96. **8.** $34.95. **9.** $5.75.

10. $283.50. 11. $63.45. 12. $229.50. 13. $83.16. 14. $37.44.
15. $41.76. 16. $609.55. 17. $11,440. 18. $241.92. 19. 226 hr.

Page 227. —

1.	*a.* $11;	*b.* $580.51;	*c.* $745.20.
2.	*a.* $19.30;	*b.* $370;	*c.* $664.74.
3.	*a.* $43.62;	*b.* $664.83;	*c.* $344.75.
5.	*a.* $2.37½;	*b.* $1.68¾;	*c.* $3.26.
6.	*a.* $1.04;	*b.* $1.37;	*c.* $5.84.
7.	*a.* $3.09;	*b.* $1.81;	*c.* $10.15.
8.	*a.* $9.05;	*b.* $416;	*c.* $5.62.
9.	*a.* $9.12;	*b.* $5.34;	*c.* $12.21.
10.	*a.* $5.12;	*b.* $6.40;	*c.* $3.04.
11.	*a.* $45.64;	*b.* $32.96¼;	*c.* $62.57.
12.	*a.* $4681.25;	*b.* $3815.64;	*c.* $70.81.
13.	*a.* $2854.98;	*b.* $154.69;	*c.* $35.69.
14.	*a.* $80.22;	*b.* $106.24;	*c.* $4511.52.
15.	*a.* $54.46½;	*b.* $29.91;	*c.* $4396.50.

Page 228. — 2. 30 belts. 3. 13 lb. 4. 163 gal. 5. 18 yd.
6. 35 mo.; 2 yr. 11 mo. 7. 325 bars. 8. 160 A. 9. 126 trees.
10. $74.

Page 230. — 1. $27. 2. $420. 3. $36.50. 4. $15. 5. $255.
6. $15.75. 7. $7.50. 8. $23.90. 9. $950. 10. $24.75. 11. $52.25.
12. $52.50. 13. $4.50. 14. $54. 15. $4.25. 16. $8.12. 17. $1.95.
18. $4.50. 19. $3.25. 20. $7.20. 21. $4.85. 22. $3. 23. $2.25.
24. $.12 25. $3.25. 26. $1.25. 27. $3.09. 28. $.25. 29. $.15.
30. $3.55. 31. $.04. 32. $.18. 33. $.12. 34. $.75. 35. $.25.
36. $3.50. 37. $.22. 38. $.20. 39. $3.75. 40. $1.75. 41. $.11.
42. $.20. 43. $3.25. 44. $.20.

Page 231. — 1. $3.37½. 2. $528. 3. $64. 4. $16. 5. $477.
6. $36. 7. $149.64. 8. $500. 9. $2080. 10. $83.25. 11. $36.40.
12. $7.20. 13. $1024. 14. $1843.75. 15. $378. 16. $10.50.
17. $67.86. 18. $19. 19. $12.50. 20. $6.25. 21. $30. 22. $6.57.
23. $12. 24. $4723.71. 25. $18,889.06. 26. $22,479.55. 27. $11,376.97.

Page 232. — 3. 12. 4. 25 yd. 5. 12. 6. 15 ft. 7. 12. 8. 12 in.
9. $25. 10. 16 da. 11. 39 bu. 12. $104. 13. 28 mi.

Page 233. — 1. $5.25. 2. $4.95. 3. $3. 4. $10. 5. $6.25.
6. $3. 7. $3.60. 8. $55. 9. $145. 10. $1.90. 11. $5.25.
12. $9.60. 13. $9. 14. $18. 15. $8. 16. $21. 17. $32.
18. $22. 19. $34. 20. $16. 21. $12. 22. $19. 23. $1.85.
24. $1.74.

Page 234. — 1. 7 cows. 2. $980. 3. 56 acres; $1988. 4. $2587.20.
5. $98. 6. $242.50. 7. $540. 8. $7. 9. $435. 10. $532.50.
11. $21.60.

Page 236. — 1. 20 yd. 2. 462 ft. 3. 192 in. 4. 4 ft. 5. 5280 ft.
6. 5280 ft. 7. 60 in. 8. 10 ft. 9. 24 yd. 10. 35 ft. 11. 3750 ft.
12. 1980 ft. 13. 228 ft. 14. 5940 ft. 15. 810 yd.; 950 yd. less.

16. 42,240 ft. **17.** 27,075 ft. **18.** 9 mi. **19.** 2640 ft.; 160 rd. **20.** 7920 ft. **21.** 66 ft.; 22 yd.

Page 239. — **1.** 2 gal. **2.** 96 pk. **3.** 432 sq. in. **4.** 51 ft. **5.** 1440 in. **6.** 800 oz. **7.** 12,000 lb. **8.** 18½ bu. **9.** 11,250 ft. **10.** ¼ ft. **11.** 1920 rd. **12.** 120 yd. **13.** 404 ft. **14.** 774 sq. yd. **15.** 11 doz. + 11; 13 doz. + 9; 16 doz. + 3. **16.** 1728 sq. in. **17.** 78 sq. ft. **18.** 20¢ profit per bu. **19.** 1008 sq. ft.; 1008 sq. ft. **20.** 3600 ft. **21.** $32.

Page 241. — **3.** 64 cu. in. **4.** 36 cu. in. **5.** 24 cu. in. **6.** 1152 cu. in. **7.** 108 cu. in. **8.** 60 in. cubes. **9.** 300 cu. in.

Page 242. — **11.** 155. **12.** 190. **13.** 195. **14.** 162. **15.** 196. **16.** 121. **17.** 217. **18.** 152. **19.** 189. **20.** 162. **21.** $186.67. **22.** $60.13. **23.** $94.87. **24.** $128.80. **25.** $163.36. **26.** $480.01. **27.** $520.98.

Page 243. — **1.** *a.* $32,538.46; *b.* $28,736.50; *c.* $30,165.56. **2.** *a.* $21,464.87; *b.* $24,836.37; *c.* $20,168.03. **3.** *a.* $20,184.93; *b.* $21,878.20; *c.* $24,181.02.

Page 244. —

1. *a.* $583.07;	*b.* $624.02;	*c.* $624.79;	*d.* $290.68.
2. *a.* $313.68;	*b.* $187.39;	*c.* $290.95;	*d.* $310.78.
3. *a.* $303.47;	*b.* $110.29;	*c.* $ 90.95;	*d.* $175.40.
4. *a.* $694.64;	*b.* $701.42;	*c.* $631.41;	*d.* $ 37.02.
5. *a.* $572.26;	*b.* $249.69;	*c.* $610.77;	*d.* $101.35.
6. *a.* $501.79;	*b.* $ 46.65;	*c.* $116.79;	*d.* $ 96.96.
7. *a.* $162.38;	*b.* $ 74.29;	*c.* $ 31.58;	*d.* $449.59.
8. *a.* $ 87.99;	*b.* $780.47;	*c.* $461.10;	*d.* $278.17.

Page 245. —

1. 1,650,315.	**2.** 4,848,332.	**3.** 4,790,440.
4. 5,700,950.	**5.** 3,766,184.	**6.** 6,152,208.
7. 7,085,248.	**8.** 1,410,759.	**9.** 1,579,056.
10. 2,515,456.	**11.** 1,817,586.	**12.** 425,802.
13. 3,175,035.	**14.** 6,840,288.	**15.** 2,771,178.
16. 1,636,776.	**17.** 1,027,780.	**18.** 1,771,250.
19. 2,899,584.	**20.** 6,442,944.	**21.** 3,300,300.
22. 3,433,020.	**23.** 1,375,269.	**24.** 3,996,594.
25. 5,681,650.	**26.** 3,069,565.	**27.** 5,644,224.
28. 2,818,044.	**29.** 3,821,477.	**30.** 2,713,290.
31. 2,597,868.	**32.** 4,449,818.	**33.** 1,095,128.
34. 5,999,402.	**35.** 3,552,000.	**36.** 5,428,024.
37. 3,264,066.	**38.** 6,343,628.	**39.** 4,177,928.
40. 2,170,135.	**41.** 1,420,467.	**42.** 4,457,502.
43. $24,210.90.	**44.** $33,809.22.	**45.** $64,758.96.
46. $32,760.96.	**47.** $14,997.15.	**48.** $28,704.06.
49. $62,133.75.	**50.** $19,239.75.	**51.** $11,784.15.
52. $28,222.30.	**53.** $52,063.88.	**54.** $28,619.52.
55. $59,865.66.	**56.** $50,242.14.	**57.** $11,689.26.
58. $33,579.	**59.** $56,158.88.	**60.** $73,262.16.
61. $50,501.22.	**62.** $31,043.10.	**63.** $36,657.87.

Page 246. — 1. *a.* 256, rem. 50; *b.* 106, rem. 172; *c.* 37, rem. 537.
2. *a.* 1237, rem. 7; *b.* 98, rem. 179; *c.* 89, rem. 764.
3. *a.* 236, rem. 15; *b.* 109, rem. 423; *c.* 158, rem. 144.
4. *a.* 1523, rem. 6; *b.* 98, rem. 174; *c.* 46, rem. 684.
5. *a.* 355, rem. 71; *b.* 100, rem. 124; *c.* 99, rem. 454.
6. *a.* 979, rem. 13; *b.* 122, rem. 658; *c.* 63, rem. 415.
7. *a.* 1039, rem. 25; *b.* 221, rem. 4; *c.* 172, rem. 60.
8. *a.* 2120, rem. 22; *b.* 110, rem. 345; *c.* 24, rem. 48.
9. *a.* 2678, rem. 11; *b.* 18, rem. 768; *c.* 83, rem. 346.
10. *a.* 671; *b.* 165, rem. 387; *c.* 62, rem. 222.
11. *a.* 598, rem. 50; *b.* 188, rem. 346; *c.* 215, rem. 125.
12. *a.* 207, rem. 25; *b.* 109, rem. 202; *c.* 40, rem. 802.
13. *a.* 392, rem. 28; *b.* 79, rem. 546; *c.* 117, rem. 46.
14. *a.* 2008, rem. 9; *b.* 105, rem. 68; *c.* 252, rem. 220.
15. *a.* 957, rem. 6; *b.* 84, rem. 39; *c.* 57, rem. 241.
16. *a.* 1044, rem. 25; *b.* 36, rem. 46; *c.* 83, rem. 364.
17. *a.* 2089, rem. 30; *b.* 80, rem. 25; *c.* 113, rem. 331.
18. *a.* 757, rem. 46; *b.* 307, rem. 43; *c.* 68, rem. 591.
19. *a.* 1279, rem. 47; *b.* 267, rem. 53; *c.* 103, rem. 196.
20. *a.* 987, rem. 64; *b.* 58, rem. 174; *c.* 133, rem. 76.
21. *a.* 954, rem. 13; *b.* 42, rem. 388; *c.* 249, rem. 186.
22. *a.* 810, rem. 17; *b.* 77, rem. 237; *c.* 83, rem. 18.
23. *a.* 1234, rem. 40; *b.* 131, rem. 400; *c.* 154, rem. 307.

Page 247. — 1. $438.25. 2. $990. 3. $11,900. 4. $6.59. 5. $5.24. 6. $10.88.

Page 248. — 3. 8 words. 4. $3.24. 5. $984. 6. $26.46. 7. $660.

Page 249. — 2. 446 sheep. 3. $816.75. 4. $8615.

Page 250. — 2. $6020. 3. 8624$\frac{3}{8}$ gal. 4. 86. 5. 602.

Page 251. — 2. $6.16. 3. 504 mi. 4. 36 da. 5. $984. 6. $2.62. 7. $348.

Page 252. — 2. 74 A. 3. 50 cows. 4. 80 ft. 5. 304$\frac{8}{15}$. 6. $21. 7. 40 rings.

Page 253. — 2. $.12$\frac{1}{2}$. 3. 50 da. 4. $157.50. 5. 60 da. 6. $25.20. 7. 10,976 lb. 8. $14,700.

Page 254. — 1. *a.* 81 in. 2. *a.* 1,111,500. 3. *a.* 56, rem. 536.
4. *a.* $285.87. 5. *a.* $356.75. 6. *a.* $394,683.55. 1. *b.* 102$\frac{1}{2}$.
2. *b.* 9. 3. *b.* 39$\frac{1}{4}$. 4. *b.* 50. 5. *b.* 5$\frac{1}{4}$. 6. *b.* 17. 1. *c.* 188,000.
2. *c.* 77, rem. 34. 3. *c.* 85,800. 4. *c.* 6. 5. *c.* 42.59, rem. 11.
6. *c.* 76 qt. 7. *c.* $4.20. 1. *d.* $45.90. 2. *d.* $1.40. 3. *d.* $1.04.
4. *d.* $.66. 5. *d.* $.12. 6. *d.* $6.75. 7. *d.* $175.35. 1. *e.* $\frac{5}{8}$.
2. *e.* $\frac{5}{9}$. 3. *e.* $\frac{5}{6}$. 4. *e.* $\frac{1}{4}$. 5. *e.* $\frac{3}{4}$ yd. 1. *f.* $.56. 2. *f.* $.28.
3. *f.* $1.61. 4. *f.* $3.24. 5. *f.* $3.59, rem. $.61.